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IN THE

Supreme Court of the United States

OCTOBER TERM, 1979

No. 79-1661

KEARNEY-NATIONAL, INC.,
Petitioner,

vs.

BURNDY CORPORATION,
Respondent.

PETITION FOR WRIT OF CERTIORARI TO THE UNITED STATES COURT OF APPEALS FOR THE SECOND CIRCUIT

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To the Honorable, the Chief Justice, and the Associate Justices of the Supreme Court of the United States:

Kearney-National, Inc., your petitioner, prays that a Writ of Certiorari issue to review the decision of the United States Court of Appeals for the Second Circuit entered in this case upon November 13, 1979, rehearing denied on January 22, 1980.

OPINIONS BELOW

The opinion of the United States Court of Appeals for the Second Circuit (Appendix A, infra, p. A-1) remains unreported. Rehearing was denied on January 22, 1980 (Appendix B, p. A-3). These affirmed the opinion of the United States District

Court for the Southern District of New York (Appendix C, infra, p. A-23, A-32) with that opinion being reported at 466 F. Supp. 80.

JURISDICTION

The judgment of the Court of Appeals for the Second Circuit was entered on November 13, 1979, rehearing denied on January 22, 1980, and this Court's jurisdiction is invoked under 28 U.S.C. §1254(1). Jurisdiction in the District Court was founded on Title 28, U.S.C. §§1338, 2201, and 2202.

QUESTIONS PRESENTED

1. Does the Constitution permit the Federal Court to ignore the statutory presumption of patent validity when holding the claims of a United States patent to be invalid, when the Court relies solely upon the same prior art patents that were reviewed and considered by the Patent Office examiner during the prosecution of the patent and continuation-in-part applications that led to the patent in suit?

2. Does the Constitution permit the Federal Court to ignore the standards of invention as adjudicated by this Court and hold a patent invalid even though the Court found the patented invention in suit to provide a combination that resulted in "significant improvements" in the subject technology?

CONSTITUTIONAL AND STATUTORY PROVISIONS INVOLVED

Constitution of the United States

Article I, Section 8, Cl. 8:

> "The Congress shall have power . . . To promote the progress of science and useful arts, by securing for limited times to . . . inventors the exclusive right to their discoveries."

Statutes

35 U.S.C. §103:

> "A patent may not be obtained . . . if the difference between the subject matters sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains."

25 U.S.C. §282:

> "A patent shall be presumed to be valid. Each Claim of a patent . . . shall be presumed valid independently of the validity of other claims; dependent on multiple dependent claims shall be presumed valid even though dependent upon an invalid claim. The burden of establishing the validity of a patent or any claim thereof shall rest on the party asserting such invalidity."

STATEMENT OF THE CASE

Preface

This case involves a patent upon an electrical connector having utility for holding a pair of electrical conducting lines together. The United States District Court, and the Second Circuit Court of Appeals through its affirmance with its summary opinion, found that the patented invention did combine the elements of its electrical connector in new ways, that the combination resulted in significant improvements in H-frame connector technology; and, the Courts then proceeded to give a broader construction to the very same prior art patents applied by the Patent Office examiner in holding the said patent invalid, totally ignoring that presumption of validity that prevails in favor of an issued patent. With regard to the fact that such statutory presumption should be strengthened when the prior

art is the same as that applied by the examiner in the United States Patent Office, the Court only said that all such presumption requires is that a reasonably doubt on the question of validity shall be resolved in favor of the patent holder, but such a holding is not in accordance with other similar decisions in the Second Circuit, and totally contrary to decisions relative this issue in the other Circuits. In addition, since the statutory presumption of validity should have been strengthened, rather than weakened and ignored, and since the Court found the invention to comprise a new and significantly improved combination, then the Court, in its analysis under Title 35, U.S.C. §103, should have recognized the invention as containing patentable subject matter, and should have further given consideration to the other various secondary considerations, such as long felt need, the fact that the Kearney-National patent was a well licensed patent, and a highly commercial success, then such additional considerations should have tipped the scale in favor of the patent's validity, rather than otherwise. It is submitted, therefore, that the opinion advanced by the District Court, and as routinely affirmed without opinion by the Court of Appeals, contains obvious reversible error.

Statement of the Proceedings

This lawsuit was initiated on July 2, 1975, by Burndy Corporation, the Respondent herein, against Kearney-National, Inc., Petitioner herein, by way of declaratory judgment for patent invalidity and noninfringement of the latter's United States patent No. 3,322,888, which issued on May 30, 1967, upon the invention of C. G. Zemels pertaining to a compression connector. (Copy of patent in Appendix D, p. A-40, A-41). By way of counterclaim, Kearney accused Burndy of patent infringement of its aforesaid patent, and sought the District Court's holding that the said Zemel's patent was valid, and that particular of its claims were infringed by certain of the equivalent electrical connectors being manufactured and sold by Burndy since around

the year 1973. In a trial of this cause of action conducted in the United States District Court for the Southern district of New York, a bench trial was conducted during the time of April 11 through April 18, 1977, resulting in the Court's opinion dated January 2, 1979, that the Kearney patent was invalid. The Court did not undertake to investigate the existence of infringement of any of the claims of the Kearney patent by the Burndy connectors in evidence, but did recognize that Burndy had conceded at trial that its compression connectors infringed at least claim 1 of the Kearney-Zemels patent

Statement of the Facts

In the early 1940's, Kearney originated the first H-frame electrical connector for use in connecting tap off and other wires to electrical lines through a crimping of the connector, and such was protected in its United States patent No. 2,707,216. This particular Kearney patented connector was improved upon and protected in a subsequent United States patent No. 2,707,775, which provided means in the nature of extended portions, or tabs, that are useful for initially holding the electrical line or tap within their respective channels pending the initial crimping action. The Kearney connector generally formed from this latter patent was identified in the trade as its 81 Series connectors, and there were twelve connectors in number required to accommodate the seventy-eight electrical wires generally making up the list of electrical lines from which the line connectors and tap wires were selected for use by the utilities. These style of connectors were sold by Kearney during the 1950's, and into the 1960's. These connectors worked well for their intended purposes, but Kearney was experiencing problems with two of the twelve connectors, which could only be crimped about their designated conductors through the use of the hydraulic tool, because the use of the manual tool required too great of a physical or manually applied force to perfect a full closure of the handles of the tool during crimping, which generally resulted in poor electrical transfer and faulty conduct of charge

from the conductor to its tap when one of these two connectors was installed. As a result of the problems with these two specified connectors of the 81 Series, Kearney was receiving many complaints from the field about these connectors, and even one of the co-inventors of the Kearney patent No. 2,707,775, and which patent covers these two problem connectors, and which employee by this time had transferred from the engineering department into sales, would call in his objection from the field with these two problem connectors.

Many of the personnel at Kearney gave consideration to the problem, many minds worked upon ways to find a solution to the same, including its chief engineer, and even the immediate engineering supervisor to Mr. Zemels, the inventor of the patent involved in this lawsuit, but none could find a solution to the same. Mr. Zemels, the inventor, began to look for a solution to this problem on his own, because he felt that if the two problem connectors could not be properly crimped by a mechanical tool, but rather required the use of the hydraulic tool, that there must be a good reason for that deficiency, and he was curious to see if he could find a solution to this problem. A number of weeks later he approached his superior with very rough sketches indicating his thoughts as to a possible solution to the problem, and his solution was to provide a formation of some type of void or channels, located at the sides of the connector, and arranged at a specifically spaced relation with respect to the upper and lower line receiving sockets of the connector. And, he considered it essential that any resolution of the problem give consideration to the various tap and line conductors located in the respective sockets of the connector so that proper wrap around and electrical conducting characteristics could be achieved through connector crimping. In general, the Zemels' design, as finally arrived at, provided for a controlled wrap around of the various lips of the connector about the lines and tap conductors, and to achieve such through the use of a reduced handle load or manual force on the crimping tool, so that the lesser expensive

manual tool, as distinct from the much more expensive hydraulic tool, could be used by the linemen for crimping all of the connectors about the various lines.

After Mr. Zemels completed his work in designing the replacements for the two problem connectors of the old 81 Series, the Company was so enthused with his findings that it had him undertake the project of redesigning its entire 81 Series of electrical connectors, and bring them into conformance with the teachings of his invention, and, as a result of this further effort, he was able to reduce the previous twelve connectors of the series down to only seven, which became known as the Ultra Squeezon 500 Series of connectors for Karney, and which seven conenctors could still accommodate the entire range of seventy-eight conductors normally used by the utilities when selecting the line and tap connectors for electrical connections. And, the hand loads required to accomplish such were significantly reduced so that only the manual tool, and not the hydraulic tool, would suffice. The seven connector series was introduced to the market by Kearney during the mid-1960's, and became a marketing success. In addition, a patent application, which was eventually refiled as a continuation-in-part application, was filed in the United States Patent Office, and resulted in the issuance of the patent involved in this lawsuit, that being the Zemels' United States patent No. 3,322,888. (Appendix D).

Burndy Corporation, the Respondent, presented during the trial a brief history of its involvement in the compression connector business, and more specifically through a vice president, explained the derivation of its various style of connectors that it had been selling to the trade during the 1950's, generally identified as a C-shaped connector, as distinct from the H-shaped connector of Kearney. And, as the vice president states, its C connector program had very good growth throughout the entire 1960's. The vice president also stated that while the Company was happy with its C-connector program, and its sales, that

anybody who has been involved in sales and marketing generally becomes unsatisfied with not having more of the business, and therefore, his Company decided that it should consider offering an H-frame connector to the marketplace. The vice president further commented that the reason why Burndy felt it must undertake the manufacture of an H-frame connector is that the utilities were moving towards a standardization program, and as a result, the sales of their C-connector business had flattened.

In fact, what really occurred during the latter part of the 1960's, and during the early 1970's, as the evidence in this case indicated, this vice president for Burndy actually wrote a memorandum to himself wherein he analyzed the serious problems that Burndy was having with its C-connector program, and how so many of the utilities were dropping its C-connector for the H-frame connector as developed and sold by Kearney and its licensees. As the vice president stated in his memorandum,

> "The main reason for my concern is the evident increase in opposition to the Cabelok Crimpit which appears to have accelerated in recent months. In addition to the old problems with which we are all familiar, I have noted that we have just been removed from the standards of Public Service of Colorado on Cabeloks as a result of the linnmen complaints and here we have good friends who have stalled this off as long as possible. Similarly, the letter from John Shaffer of Pacific Power & Light indicates that Harry Pearson, a very good Burndy friend, is being forced to add the H-frame to the standards because of the pressure from the line department and it is very clear that if both are available to the line crews, they will not use the Cabelok.

And, this vice president for Burndy exercised his business judgment as to how to meet the strong competition from the Kearney H-frame connector which was causing Burndy to lose sales, by expressing the following:

> "Suppose we were to proceed and introduce an H-frame which is an exact duplicate to the present Kearney approach, step the tide of people switching away from Burndy to H-frame by our ability to deal with them on the H-frame where the problem arises, and giving our sales organization a chance to go after 70% of the compression tab connector market that we do not now enjoy by being able to offer an immediate and direct substitute for the Kearney line."

When the facts are reviewed regarding the problems facing this Burndy vice president in the sales of their C-connector, and how the Kearney H-frame connector sales were seriously damaging Burndy's marketing program, one can readily understand the reason for Burney's reaction to the new Kearney product as being something comparable to that expressed in *Plantronics, Inc.* v. *Roanwell Corporation* (D.C., S.D. N.Y., 1975) 403 F.Sup. 138, 147, wherein the Court recognized the impression of the infringer therein as:

> "It's reaction was favorable to the point of envy."

Actually the evidence in this case clearly shows what occurred concerning the Burndy project to develop an H-frame connector, wherein various meetings were conducted at Burndy in an effort to determine what should be done with respect to the deteriorating market for their C-connector business, and that the only alternative was to make a directly infringing copy of the H-frame connector of Kearney, since that particular product was directly in competition with the Burndy established connector. It was decided in the early 1970's, by the Burndy personnel, that they should "Go with Kearney" in copying the Kearney patented connector. In addition, Burndy acquired one of each of the seven sizes of the Kearney patented connector, from the marketplace, and had an engineer in its engineering department take measurements from each of these connectors by producing their original production drawings. The engineer took one of

each of the Kearney patented connectors, of the type explained in its patent No. 3,322,888, and cut a slice of each connector, of each size, and measured them upon an optical comparitor. From the optical comparitor he acquired tracings, and from these tracings Burndy attained precise measurements of the Kearney connectors, from which it made its original production drawings. Burndy did not even make any development drawings of the traced Kearney connectors, but rather, it made its original production drawings, since in this manner it was able to save a lot of time and effort in getting its competing connector onto the market.

Kearney filed a United States patent application upon its improved H-frame connector, and prosecution proceeded upon the application upon this connector, and then, in accordance with the patent laws, and Patent Office rules, Kearney filed a continuation-in-part application to add further clarification upon this invention to the Patent Office. During the prosecution of this application in the United States Patent Office, in both the parent and continuation-in-part applications, some ten United States patents were relied upon by the Patent Office examiner prosecuting this application. After some period of time of prosecution, the said United States patent issued, on May 30, 1967, upon this invention by Mr. C. G. Zemels. And, in the opinion of the District Court in holding this United States patent invalid, the judge relied upon the very same United States prior art patents that were given thorough consideration and reviewed by the Patent Office examiner during the prosecution of this parent and continuation-in-part application in the Patent Office. No additional patents were reviewed or given consideration by the Judge in his opinion.

REASONS FOR GRANTING THE WRIT

I.

Nowhere Does the Constitution Permit the Federal Court to Ignore the Statutory Presumption of Patent Validity When Holding the Claims of a United States Patent to be Invalid, Nor Even More So to Rely Solely Upon the Same Prior Art Patents That Were Reviewed and Considered by the Patent Office Examiner During the Prosecution of the Patent in Suit to Hold It Invalid.

Title 35, United States Code, §282, entitled Presumption of Validity, clearly states that:

> "A patent shall be presumed valid . . . The burden of establishing invalidity of a patent or any claim thereof shall rest on the part asserting such invalidity."

The respondent, Burndy Corporation, initially brought this lawsuit itself by way of declaratory judgment, specifically seeking a declaration that the patent No. 3,322,888, is invalid under various sections of Title 35, United States Code. Thus, by law, there is a clear burden upon the respondent to prove by way of some degree of evidence that the patent in suit is invalid, and such proof must by law be sufficient to overcome that statutory presumption of validity that prevails in favor of an issued United States patent.

Contrary to the law as stated above, the District Court, in its opinion, gave no recognition to the presumption of validity that prevails in the current lawsuit, and in fact, stated, in a footnote 31 of its opinion:

> "For the most that can be said of the presumption is that it requires that reasonable doubt on the question of validity be resolved in favor of the patent holder."

Thus, not only did the Court fail to give any recognition to the presumption of validity, as required by law, but to the contrary, it relegated the presumption to the status of a footnote statement that such presumption simply can be ignored, and in fact, as can be seen from the text of the opinion from which the footnote derives, the court ignored the presumption and assigned no more status than it does in the handling of the various secondary considerations that a Court may in its discretion review when analyzing a patent for its validity. Thus, for all practical purposes, there was no presumption of validity that prevailed in this case at all with respect to the subject United States patent.

To place the handling by the district Court of this presumption of validity into its proper perspective, and how erroneous the Court was in its holding on this point, it must be restated that all of the prior art patents introduced into evidence by the respondent, during the trial of this cause of action, in addition to that prior art relied upon by the District Court in its opinion, had been thoroughly reviewed by the Patent Office examiner during the prosecution of the patent in the United States Patent Office. Thus, under these circumstances, the Courts normally hold that where all of the prior art before the Court is the same as that reviewed by the Patent Office, then the presumption of validity is heightened, and should not be ignored as performed by the District Court in this case. See *Lyon* v. *Bausch & Lomb Optical Co.*, 119 F.Supp. 42 (S.D.N.Y., 1953), aff'd 224 F.2d 530 (2d Cir.), cert. den. 350 U.S. 911, (1955); *Cutler Mail Chute Co.* v. *Capitol Mail Chute Corp.*, 118 F.2d 63, (2d Cir.), cert. den. 313 U.S. 580, (1941).

There is a clear conflict among the Circuits regarding the handling of this statutory presumption of validity, and in addition, there appears to even be a conflict in the Second Circuit itself with respect to this issue. The Second Circuit Court of Appeals, as previously alluded to, merely summarily affirmed the District Court. And, in doing so, simply adopted the reasoning of the District Court judge, even with respect to his totally ignoring of the statutory presumption of validity.

The Supreme Court has well recognized the substantial weight that the statutory presumption affords the patentee in infringement litigation, in stating that:

> "... patentees are heavily favored as a class of litigants by the patent statute. Section 282 of the Patent Code provides, in pertinent part: 'A patent shall be presumed valid. The burden of establishing invalidity of a patent shall rest on a party asserting it.'"

See *Blonder-Tongue Laboratories, Inc.* v. *University of Illinois Foundation, et al.*, 402 U.S. 313, 335 (1971). In addition, as the Court stated in *Hildreth* v. *Mastoras*, 257 U.S. 27, 32 (1921):

> "The presumption of priority and novelty which arises from the granting of a patent must have greatly increased weight when the claim of the inventor was subjected to close and careful scrutiny in the Patent Office under the stimulus of a heated contest."

Such a condition prevails in the current case, with the examiner forcing the applicant into a continuation-in-part application in its efforts to attain a United States patent, with all the very same prior art relied upon by the Court in holding this patent invalid having been previously thoroughly reviewed by the same Patent Office examiner who presecuted both the said parent and continuation-in-part applications leading to this patent in suit.

As previously alluded to, the District Court Judge simply held that only in the circumstance of reasonable doubt regarding the validity of a patent need the presumption be given consideration. This relegates the presumption to after the fact. It is submitted that the District Court is in conflict with other decisions within its own Circuit, and in addition, is also in conflict with decisions from all the other Circuits. For example, this holding is contary to the established law in the Second Circuit, wherein it has frequently been held that not only does the presumption of validity prevail in a patent caes, but,

> "...this presumption is heightened by a showing that the prior art was adequately considered."

Ling-Temco-Vought, Inc. v. *Kollsman Instrument Corp.* (C.A. 2, 1967) 372 F.2d 263. See also, *Rich Products Corporation* v. *Mitchell Foods, Inc. et al.* (C.A. 2, 1966) 357 F.2d 176, wherein the Court stated that:

> "The presumption is strengthened, in a case such as this, where the same questions were raised in prosecuting the patent in the Patent Office and there successfully met."

Numerous other cases in the Second Circuit hold similarly to the above stated comments of the Court with respect to the application of this presumption of validity.

While the Second Circuit, in this case, states that the presumption need only be considered in case of reasonable doubt regarding the validity of the patent, other circuits are quite different in their approach as to what proof is required to overcome this statutory presumption of validity. For example in the Third Circuit, in the case of *Ever-Wear Inc.* v. *Weibolt Stores, Inc.* (C.A. 7, 1970) 427 F.2d 373, it was stated that:

> "Indeed, invalidity must be demonstrated by clear and convincing proof."

See also *Trio Process Corp.* v. *L. Goldstein's Sons, Inc.* (C.A. 3, 1972) 461 F.2d 66, cert. denied 409 U.S. 997.

The Fourth Circuit requires evidence greater than a mere preponderance in order to rebut the presumption of patent validity accorded by 35 U.S.C. §282. See *Diamond International Corp.* v. *Maryland Fresh Eggs, Inc.* (C.A. 4, 1975) 523 F.2d 113.

In the case of *Ingersoll-Rand Co.* v. *Brunner & Lay, Inc.* (C.A. 5, 1973) 474 F.2d 491, cert. denied 414 U.S. 865, the Court stated:

> "One otherwise an infringer who assails the validity of a regularly issued patent bears a heavy burden of persuasion. We have variously recognized this burden to be akin to the fraud standard of clear and convincing evidence and to the criminal law standard of proof beyond a reasonable doubt, but, at a minimum, greater than a mere preponderance of the evidence."

The Sixth Circuit requires a preponderance of the evidence to overcome the statutory presumption. *Eltra Corporation* v. *Basic Incorporated* (C.A. 6, 1979) 202 USPQ 630.

The Seventh Circuit requires a clear and convincing showing of the invalidity of a patent in order to overcome the presumption of patent validity. *Chicago Rawhide Mfg. Co.* v. *Crane Packing Co.* (C.A. 7, 1975) 523 F.2d 452, cert. denied 423 U.S. 1091.

The Eighth Circuit has stated:

> "... presumption is rebuttable and may be overcome by substantial evidence negating anyone of the three essentials for patentabilty."

L. & A. Products, Inc. v. *Britt Tech Corp.* (C.A. 8, 1966) 365 F.2d 83.

Both the Ninth and Tenth Circuits require clear and convincing evidence, just as in the Seventh Circuit, in order to overcome the statutory presumption of validity. *Saf-Gard Products, Inc.* v. *Service Parts, Inc.* (C.A. 9, 1976) 532 F.2d 1266, cert. denied 429 U.S. 896; and *Moore* v. *Shultz* (C.A. 10, 1974) 491 F.2d 294, cert. denied 419 U.S. 930.

Thus conflicting rulings and holdings prevail throughout the various Circuits, and even exist within the confines of the Second Circuit itself, as to just how this presumption of validity should be handled. But, regardless whether this presumption shall prevail unless overcome by clear and convincing evidence,

a preponderance of the evidence, or any related type of standard, it is certainly clear that the District Court in this current case was clearly in error in refusing to even give any recognition to the presumption of validity, even though all of the prior patents had already been analyzed by the Patent Office examiner, and with the Court stating that only in the case of reasonable doubt must it give any recognition to this presumption. Thus, in reality, to the District Court in this case, there is no presumption at all. Such a holding is totally adverse to the dictates of the statutory law, as set forth in said Title 35, U.S.C. §282. Furthermore, this Court has long held that the defense of patent invalidity is upon the one setting it up, his burden is a heavy one, and it has been held that every reasonable doubt should be resolved against him. See, *Mumm* v. *Decker*, 301 U.S.168 (1937).

II.

Does the Constitution Permit the Federal Courts to Ignore the Standards of Invention as Adjudicated by This Court in Holding a Patent Invalid Even Though the Court Found the Invention Involved to Provide a Combination That Resulted in Significant Improvements in the Subject Technology?

In *Graham* v. *John Deere Co.*, 383 U.S. 1 (1965), this Court gave recognition to the fact that the federal patent power stems from the constitutional provision set forth in Article 1, Section 8, Clause 8. In view of this, and recognizing the standards of the patent statute, that patentable invention must contain novelty, utility, and be nonobvious to one skilled in the art, Title 35, U.S.C. §103, this Court then went on to set the various guidelines for determining the existence of patentable invention under this statute, in holding that three conditions must be reviewed and be made the subject of basic factual inquiries. The Court stated:

> "Under §103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy."

In view of the foregoing, the District Court then undertook to review the scope and content of the prior art. In doing so, the Court simply looked at the same prior patents that had been thoroughly reviewed by the Patent Office examiner during the prosecution of the patent in suit, and rendered its opinion of obviousness based solely upon those patents. This is so even though clear evidence was admitted during the trial that the prior art devices could not attain the mechanical advantages attained by the patented connector, and in addition, all of the prior art connectors shown in the earlier patents failed to acquire the proper electrical characteristics needed when subjected to the type of testing conducted by the testing laboratories and as required by the utilities before they will undertake to use such an electrical connector in its business. Thus, not only was each connector shown in the prior art structured in a manner different from that of the current invention, particularly as delineated in the patent claims, but said connectors could not attain the mechanical and electrical characteristics sought for and acquired from the patented invention.

And, even in view of this analysis made by the District Judge himself, of these various prior art patents, he recognized that the invention of the Zemels' patent:

> "...resulted insignificant improvements in H-frame connector technology, including the obtaining of a more desirable fit between the connector and the conductors by the exertion of less force than had been necessary in the past; the ability to effect such a fit on all models of conductors by means of a hand compressor (rather than a hydraulic compressor); and the reduction of 11 [12] to 7 in the number of models of connectors necessary to connect all sizes of conductors then in use."

Thus, by the Court's own analysis, the current invention presented a combination that added significant improvements to the connector technology art. And, such observation was made in view of the prior art patents reviewed by the District Court, and which art as previously stated, were the same prior art patents that were given consideration by the Patent Office examiner during prosecution of the patent in suit.

The Graham test further suggests that the difference between the prior art and the claims that issue are to be ascertained. The main claim 1 of the Zemels' patent called for a pressure connector having oppositely disposed sockets, one socket being larger than the other, and having a ductile body of metal extending between said sockets, and with the crosswise body of metal having a void therein for accommodating compression and to shorten the distance between sockets, with the void being located substantially closer to the smaller than the larger socket. After reciting this claim, the Court simply held that there are no differences between this claim and the prior art, but, as previously analyzed, and by the Court's own remarks, the combination of the Zemels patent provided significant improvements, over such prior art, and, the critical feature of the subject invention was just not shown in the prior art, and that which affords these enhanced results to the connector's operation, and that is the locating of a void within that crosswise ductile body of metal and being arranged closer to the smaller than the larger socket. This clearly is just not shown in the prior art,

even though the Court simply glossed over this essential fact in holding that there are no structural differences between the Zemels' connector and said prior art. The Patent Office examiner was certainly cognizant of these structural differences, and issued the patent, after having reviewed the same prior art patents that were later to be reconsidered by the District Court Judge in holding the patent invalid.

The third test as taught by Graham is that the level of ordinary skill in the pertinent art shall be resolved. The Court stated that the level of ordinary skill in the related art belongs to that reasonable person who possesses ordinary skill in design, mechanical, and electrical engineering. This was an accurate observation on the part of the Court since the Zemels connector to function properly had to possess both these good mechanical and electrical characteristics, as stated in his patent. But, the Court then went on in its opinion to find the actual level of ordinary skill in this case to be one who is thoroughly educated in mathematics, physics, and mechanics. Hence, the Court totally ignored the electrical engineering aspects of this case, that it had previously alluded to, and then focused its attention upon the expert for Burndy, who possessed mechanical skill, but presented no testimony about his having expertise in electrical engineering. Thus, the Court totally deviated from its own set standard and the standards set by this Court, as to what constitutes the level of ordinary skill in the pertinent art, in what it finally recognized as the skill of one who could testify about the validity of the patented invention at issue.

The foregoing evidences that while the Court gave the semblance of adhering to the Graham standards in analyzing a patent for its validity, in actual practice, the Court simply substituted its own hindsight and observations in total derogation of any interpreted statutory provisions and guidelines established by this Court with respect to the review of this patent, in addition to then adopting findings not in accordance with any established guidelines in order to hold the patent invalid by whatever means available.

Even regardless of how the District Court handled the various tests set forth by the Supreme Court in Graham, the Supreme Court in said case also went on to state that various secondary considerations, as previously referred to, might be utilized by the Court upon reviewing the subject matter of the patent. Thus, in the current case, the Court failed to give any recognition to the so-called secondary considerations as introduced into evidence during the taking of the testimony in this lawsuit. The Court stated, as previously explained, that it need not give any recognition to the presumption of validity of the patent in suit, and that such needs only be done in the case of reasonable doubt. But then, the Court went on to recognize that the combination of Mr. Zemels provided significant improvements in H-frame technology. At this stage, certainly the findings of the Court with respect to how significant improvements were made by the Zemels' connector to this art should have diminished any element of doubt regarding the validity of the Kearney patent, and at this stage, the presumption of validity should have been given recognition, and the various secondary considerations should have been investigated to determine the existence of the patent's validity. The fact that the Kearney connector has sold rather significantly over the past ten years, accumulating sales of from four to five million dollars ($4,000,000.00 to $5,000,000.00); the fact that it has been licensed to others and has resulted in the payment of royalties to Kearney in the amount of two hundred forty thousand dollars ($240,000.00); and the fact that a long felt need had been overcome by this improved connector, since Kearney was receiving complaints from the field about the deficiencies of its earlier H-frame style connector, of the type shown in its earlier patents, all should have been given recognition by the District court, and should have tipped the scales in favor of the validity of this Zemels patent, and not simply have been ignored, as done so by the District and Appellate Courts, in simply holding the invention obvious and the patent invalid, a decision that is totally contrary to the evidence presented in this case.

CONCLUSION

In view of the foregoing, it is submitted that both the District Court, and the Court of Appeals, have significantly errored as a matter of law in holding the patent in suit invalid, that the Court's total disregard for the statutory presumption of validity is a clear error of law and that right to due process in the review of one's patent in a lawsuit; that the Second Circuit, at least with respect to this District Court's holding, is in conflict with the other Circuits regarding what weight is to be given to the presumption of validity, and the Court's analysis under the Graham guidelines while properly stated, were then bypassed in its legal conclusion.

Petitioner respectfully submits that this petition is with merit and should be granted by this Court.

Respectfully submitted,

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APPENDIX

APPENDIX A

UNITED STATES COURT OF APPEALS

FOR THE

SECOND CIRCUIT

79-7160

Filed November 13, 1979

Corrected

At a stated Term of the United States Court of Appeals for the Second Circuit, held at the United States Courthouse in the City of New York, on the 13th day of November, one thousand nine hundred and seventy-nine.

Present:

HONORABLE WILFRED FEINBERG

HONORABLE WALTER R. MANSFIELD

Circuit Judges

HONORABLE JACOB MISHLER

Ch. District Judge

Burndy Corporation, Plaintiff-Appellee, - against - Kearney-National, Inc., Defendant-Appellant.	79-7160 79-7264

Appeal from the United States District Court for the Southern District of New York.

This cause came on to be heard on the transcript of record from the United States District Court for the Southern District of New York, and was argued by counsel.

ON CONSIDERATION WHEREOF, it is now hereby ordered, adjudged, and decreed that the judgment of said District Court be and it hereby is AFFIRMED on the opinion of Judge Broderick, dated January 2, 1979.

/s/ WILFRED FEINBERG

/s/ WALTER R. MANSFIELD
Circuit Judges

/s/ JACOB MISHLER,
Ch. District Judge

APPENDIX B

UNITED STATES COURT OF APPEALS

SECOND CIRCUIT

79-7160

Filed January 22, 1980

At a Stated Term of the United States Court of Appeals, in and for the Second Circuit, held at the United States Court House, in the City of New York, on the twenty-second day of January, one thousand nine hundred and eighty.

Present: HON. WILFRED FEINBERG
HON. WALTER R. MANSFIELD
Circuit Judges
HON. JACOB MISHLER
District Judge

Burndy Corporation, Plaintiff-Appellee-Cross-Appellant, - against - Kearney-National, Inc., Defendant-Appellant-Cross-Appellees.	79-7160

A petition for a rehearing having been filed herein by counsel for the defendant-appellant-cross-appellee, Kearney-National, Inc.,

Upon consideration thereof, it is

Ordered that said petition be and hereby is denied.

A. DANIEL FUSARO,
Clerk

APPENDIX C

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

75 Civ. 3248 (VLB)

Burndy Corporation,

Plaintiff,

- against -

Kearney-National, Inc.,

Defendant.

VINCENT L. BRODERICK, U.S.D.J.

OPINION

I.

Introduction

This is a declaratory judgment action. The subject matter of the action is a patent ("the Zemels patent") that has been assigned to defendant, Kearney National, Inc. ("Kearney"). The Zemels patent covers items known as "compression connectors."[1]

Plaintiff, Burndy Corporation ("Burndy") seeks a judgment declaring that the Zemels patent is invalid and that the manufacture, use, or sale by Burndy or its privies of compression connectors made and sold by Burndy does not constitute an infringement of any valid claim of the Zemels patent or an infringement of any other rights of Kearney. Burndy also seeks an injunction restraining Kearney and Kearney's privies from asserting infringement, and from bringing or threatening any in-

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[1]* All footnotes appear at end of this Opinion, pages A-4 - A-22, the same as in the original document.

fringement actions against Burndy and its privies based on the Zemel patent or any other patent under which defendant now has the power to assert a claim of infringement. Burndy also seeks attorneys' fees.

Kearney asserts the validity of the Zemels patent and, by counterclaim, seeks an injunction restraining Burndy from infringing the patent; compensatory damages for Burndy's alleged past infringements of the patent; and attorneys' fees.

Burndy is incorporated in the State of New York, and Kearney, incorporated in Delaware, has a place of business in New York City. Both companies are engaged in the manufacture and sale of electrical products, including electrical compression connectors.

Burndy bases its claims in this action on 35 U.S.C. §§101, 102, 103, 112, and 285.[2] Kearney bases its claims on 35 U.S.C. §271.[3]

This court has personal jurisdiction of the parties. Subject matter jurisdiction is based on 28 U.S.C. §1338, 2201, and 2202. Venue is proper under 28 U.S.C. §1391(c).

A bench trial was had herein. This opinion contains my findings of fact and conclusions of law pursuant to Rule 52(a), Fed.R.Civ.P.

II.

Conclusion

Burndy advances several arguments in support of its contention that the Zemels patent is invalid,[4] but principally relies on the argument under 35 U.S.C. §103 that the patent is invalid on the grounds of obviousness.[5]

For the reasons stated below, I find that the Zemels patent is invalid on the grounds of obviousness. 35 U.S.C. §103.

Therefore, Burndy is entitled to the declaratory judgment and injunction sought herein.[6]

Because I agree that the Zemels patent is invalid under Section 103, and because this conclusion is dispositive, I do not reach Burndy's other arguments.[7]

I find that this is not an "exceptional" case within the meaning of 35 U.S.C. §285 and conclude that Burndy is not entitled to attorneys' fees.

III.

Background and Development of the Zemels Patent

The Zemels patent,[8] originally issued to Carl G. Zemels, pertains to an electrical compression connector that is made of dead-soft aluminum and is formed in the shape of an "H". The compression connector is generally used in overhead installations, and its purpose is to connect a power-carrying conductor (called a "line conductor") to a "tap conductor" that carries the electrical power from the line conductor into a particular building. Thus power may be tapped from a line conductor and transferred, via a tap conductor, into the building of an electrical power consumer.

The electrical compression connector convered by the Zemels patent is known as an H-frame connector. The connector has a pair of upper arms (called "lips" in the patent) and a pair of lower arms (also called "lips" in the patent). Each pair of arms defines a space, which space is termed a "socket" in the patent. The H-frame connector thus has an upper socket and a lower socket. The upper socket generally is larger than the lower socket, and the upper socket is used to hold the line conductor while the lower socket is used to hold the tap conductor.

The process of installing an H-frame connector proceeds roughly as follows. A lip of the lower socket and a lip of the upper socket each has an extension or "tab." (*See* Numbers 11

and 12 of Figures 1, 2, 3, 5, Appendix A). These tabs, which are made of a weaker metal than the metal that composes the rest of the connector, are designed to be bent over into each socket by the finger of a lineman. Thus, the lineman takes the connector to the conductor; places the line conductor in the upper socket; and bends the tab into the socket over the line conductor so that the line conductor is at least loosely secured in the upper socket. The lineman then places the tap conductor into the lower socket of the H-frame connector and bends the tab of that socket over the tap conductor so that the tap conductor is at least loosely secured in the lower socket. Having thus loosely secured both the line conductor and the tap conductor in the connector, the lineman next takes a compression tool, which has dies at one of its ends, and places the dies around the opposite ends of the connector. Finally, he closes the handles of the compression tool, thereby crimping and shaping the sockets of the connector around the line conductor and the tap conductor. The H-frame connector has now been installed.

Two important goals in developing processes in this area are 1) to achieve the snuggest possible fit between the connector and the power lines, and 2) to minimize the amount of energy and effort necessary to obtain a snug fit.

In the application that led to the patent in suit, Zemels stated both of these goals as objects of his invention. The key to attaining these goals, according to Zemels, was the presence of "channels" or "voids" of a particular size and in a particular position in the body of the compression connector. (*See* Numbers 14 and 16 in Figures 1-6, Appendix A). These channels or voids, and the details regarding their size and position, are essential to all the claims of the Zemels patent.[9]

The Zemels patent must be considered against a background in which various compression connectors were developed. Kearney began to manufacture and sell H-frame connectors in the early 1940's. Kearney's original H-frame connector, which

was covered by the Graham patent,[10] had no channels in its sides. The original H-frame connector was improved upon by the Hoffman patent,[11] which was issued in 1955 and which was, like the Graham patent, assigned to Kearney. The Hoffman patent taught the addition of tabs to two of the arms of the connector. Kearney developed a series of connectors based on the Hoffman patent known as the 81 series connectors, which required twelve different sizes of connectors to accommodate the 78 different sizes of conductors that were then in use. The Series 81 connectors were manufactured and sold during the 1950's and 1960's.

Ten of the 12 sizes of Series 81 connectors could be properly crimped around the conductors by means of a hand compressor, but two models could be properly crimped only by means of a hydraulic compressor. This fact made the latter two models less desirable; a hydraulic compressor is more expensive and heavier than the hand tool and is not well regarded by the utility companies, which are the major consumers of compression connectors.

Kearney realized that these two models of connectors were less marketable than they would have been if they had been crimpable by a hand tool. Several Kearney employees, including William Olive, the Chief Engineer, and John Thornton, Zemels' supervisor, considered the problem.

In November, 1963 Zemels, a Kearney design engineer, began to consider the problem. Zemels had been graduated with the title of mechanical engineer from a university in the Soviet Union. After coming to the United States in 1949, he had worked as a design engineer for almost 14 years.

In January, 1964 Zemels developed sketches of an H-frame compression connector with channels, which he showed to Thornton. He was authorized by Thornton and Olive to do formal work on the matter. Zemels then considered the details of the proper size and location of the channels that would be

necessary to attain the optimal fit in the crimping process. He concluded, *inter alia,* that in connectors with different sized sockets, the smaller socket should have thicker arms (or "lips") than the larger socket so that the crimping process, which had to close both sockets at once, would result in a snug fit around both the larger line conductor and the smaller tap conductor. Zemels concluded further that this thickening of the arms of the tap socket in connectors with different sized sockets should be accompanied by a shifting of the channels from the midpoint of the connector to a point closer to the tap socket.

In March, 1964 Zemels conducted his first tests on his prototypes. His superiors at Kearney were favorably impressed with his progress, and he continued to work on the project of finding suitable replacements for the two problematic models in Kearney's Series 81 connectors. By early 1965, Zemels had finished the basic work on the two connectors that were later to replace the two troublesome models in Series 81. Between November, 1966 and November, 1967, Zemels redesigned Kearney's entire Series 81 on the basis of his insights. In the process he reduced the number of models from 12 to seven, which comprise Kearney's Ultra Squeezon 500 series of connectors.

In June, 1964 Zemels, through Kearney's patent attorney, filed an application with the Patent Office. This application was rejected.[12] The application that ultimately led to the Zemels patent was not filed until May, 1966, and the patent was not granted until May 30, 1967.

IV.

The guidelines for analysis under Section 103 are set forth in *Graham* v. *John Deere Co.,* 383 U.S. 1 (1966):

> Under§103, the scope and content of the prior art are to be determined; differences between the prior art and the claims at issue are to be ascertained; and the level of ordinary skill in the pertinent art resolved. Against this

> background, the obviousness or nonobviousness of the subject matter is determined. Such secondary considerations as commercial success, long felt but unsolved needs, failure of others, etc., might be utilized to give light to the circumstances surrounding the origin of the subject matter sought to be patented. As indicia of obviousness or nonobviousness, these inquiries may have relevancy.

Id. at 17-18. *Accord, Sakraida* v. *Ag Pro Inc.*, 425 U.S. 273, 280 (1976), *rehearing denied,* 426 U.S. 955 (1976); *Danns* v. *Johnston,* 425 U.S. 219 (1976); *U.S. Philips Corp.* v. *National Micronetics, Inc.*, 550 F.2d 716, 719 (2d Cir.), *cert. denied,* 434 U.S. 859 (1977).

The Scope and Content of the Prior Art

In determining the relevant scope of the prior art, a court is to look, "in light of both the training of the patentee and the elements in the claimed invention which give it its novel quality, at what arts the patentee could reasonably be expected to consult in doing the inventing [citations omitted]" *Digitronics Corp.* v. *New York Racing Association, Inc.*, 553 F.2d 740, 745 (2d Cir.), *cert. denied,* 434 U.S. 860 (1977).

The elements in the claimed invention that give it its novel quality relate to the size and location of the channels in the H-frame connector, and these elements in context relate to design, mechanical, and electrical engineering. In light of these facts, I find that the relevant scope of the prior art is design, mechanical, and electrical engineering.[13]

The content of the prior art consists of the patents and other learning that were extant at the time of the development of the purported invention in the areas of design, mechanical, and electrical engineering, as those arts pertain to the problems of electrical compression connectors and related problems. *See, e.g., Preuss* v. *General Electric Co.*, 392 F.2d 29, 32 (2d Cir.), *cert. denied,* 393 U.S. 834 (1968). Relevant to this case are five

patents that covered electrical compression connectors and that were extant at the time Zemels was working on his H-frame connector.

(1) **The Graham Patent.**[14] This patent, which was applied for in 1941 and granted in 1943, pertains to a basic H-frame connector without channels. Graham teaches that this basic H-frame connector is to be composed of a malleable material that is a good conductor of electricity; that there be in the connector a pair of parallel passages (the "sockets") to receive the conductors that are to be connected; and that the connector is to be subjected to compressive force exerted by a tool so that the connector will be crimped and will securely grip the conductors that have been placed in the passages.

(2) **The Hoffman Patent.**[15] This patent, which was applied for in 1951 and was granted in 1955, improved on the connector covered by the Graham patent by adding to the connector the bendable tabs, which are extensions of the socket arms and which allow a lineman to make a temporary fitting of the connector on the conductors by using his fingers to bend the tabs down into the sockets. Hoffman also teaches, although it does not claim, the addition of channels in the body of the connector. This teaching is present both in Figures 8 and 9 of the Hoffman drawings (*see* Appendix C) and in the application itself, which states in part:

> Figs. 8 and 9 illustrate a form of the invention according to which each side face of the body portion 1b of the connector Ab has formed therein a groove 11 that preferably though not necessarily, is V-shaped, as is shown in Fig. 8. The grooves 11 preferably extend in the direction of the diameter of the body portion of the connector, from one side of said body portion to the opposite side thereof, and by applying portions of a suitable tool T to the grooves, as is shown in Figs. 8 and 9 and causing said tool portions to move toward each other, a compressed connector will be

> forced open, as is shown in Fig. 9, for removal of the connector.

U.S. Patent No. 2,707,775.

Thus Hoffman expressly discloses channels between the sockets. Under the Hoffman patent the purpose of such channels is to facilitate opening an already crimped connector.

(3) **The Toedtman '069 Patent.**[16] This patent, which was applied for in 1957 and granted in 1960, discloses an electrical compression connector in the shape of a "6". This patent discloses the use of channels in the external sides of the connector body. (*See* Numbers 11 and 12 of Figures 1 and 4, Appendix D). The patent also discloses sockets of different sizes. The channels, which are expressly claimed by the patent, are disclosed to be closer to the smaller socket than they are to the larger socket. The stated object of the channels is to facilitate a better fit of the connector around the conductor:

> The described provisions allow the parts to yield and be formed about the wire and reduce the pressure requirements to accomplish this result, and, importantly, when compression is applied, function to induce an inward collapse of the said neck portion. Such is desirable to eliminate gaps and to produce a strong, full surface contact between the connector and the wire.

U.S. Patent No. 2,938,069.

(4) **The Toedtman '764 Patent.**[17] This patent, which was applied for in 1962 and granted in 1964, pertains to an H-frame connector and discloses the use of channels on the interior of the sockets. (*See* Numbers 17 and 22 of Figure 2, Appendix E). The patent claims the objects of such channels to be to accommodate a wide range of sizes of conductors in the sockets and to facilitate a snugger fit between the sockets and the conductors.

(5) **The Lynch Patent.**[18] This patent, which was applied for in 1963 and granted in 1965, while Zemels himself was working on his invention, pertains to an H-frame connector and a means for temporarily holding the conductors. The patent discloses the use of channels in the outside of the body of the connector. (*See* Numbers 25 and 26 of Figure 2, Appendix F). The channels are expressly claimed; their purpose is stated to be to hold bars that run through the channels and through holes in the "temporary cable [*i.e.*, connector] holding means." The "temporary cable holding means" are plates (*see* Figure 1, Appendix F) that are temporarily placed on the ends of the connector to hold the conductors in place in the sockets while the lineman prepares to crimp the connector. The "temporary cable holding means" thus take the place of the tabs, which have been seen in the Hoffman patent, the Toedtman '069 patent, and the Zemels patent.

Differences Between the Prior Art and the Claims at Issue

The principal claim in the Zemels patent is claim 1, which reads as follows:

> 1. In a compression connector of the character described having oppositely disposed conductor-receiving sockets, one of said sockets being of larger cross-sectional dimension than the other, and a body of ductile metal extending crosswise of said connector between said sockets, the improvement which comprises, said crosswise extending body of metal having a void therein for accommodating compression of said body to shorten the distance between said sockets, said void being located in spaced relation with both sockets and substantially closer to the smaller socket than to the larger socket.

U.S. Patent Number 3,322,888.

There are no differences between this claim and the prior art. The H-frame connector was taught by Graham. The use of

sockets of different sizes in a connector was disclosed by the Toedtman '069 patent. The use of a body of ductile metal between the sockets was taught by Graham. The use of a channel in the body of the connector was disclosed by Hoffman. The use of such a channel to accommodate the compression of the body was taught by the Toedtman '069 patent[19] and was also clearly foreshadowed by the Toedtman '764 patent.[20] Thus, the claim of using the channels to accommodate the compression of the body does not distinguish claim 1 of the Zemels patent from the prior art.[21] Nor does the final portion of claim 1, that the channel is located substantially closer to the smaller socket than to the larger socket, distinguish claim 1 from the prior art. That relation of channel to sockets was taught by the Toedtman '069 patent. (*See* Figure 1, Appendix D).

Claims 2 and 3 of the Zemels patent,[22] which give specific mathematical information about the connector described in claim 1, differ from the prior art only in the greater specificity with which they describe the spatial relations between various components of the connector.[23]

Claim 4,[24] besides repeating many of the claims made in claim 1 and the mathematical information stated in claim 2, states that the channel extends the full length of the body of the connector. This does not distinguish claim 4 from the prior art because extending the channel the full length of the connector was disclosed by both the Toedtman '069 patent (*see* Number 11 of Figures 1 and 2, Appendix D) and the Lynch patent. (*See* Number 26 of Figure 2, Appendix F).

Claim 5[25] is not different from the prior art because the placement of the channel on the exterior of the connector was taught by Hoffman, Toedtman (the '069 patent), and Lynch. Claim 6[26] is not different from the prior art for the same reason that claim 5 is not.

Claims 7 and 8,[27] which give specific mathematical information about the connector of claim 6, differ from the prior art

only in the greater specificity with which they describe the spatial relations of various components of the connector.

Claim 9[28] does not differ from the prior art by claiming that the connector is compressible to the cross-section of the sockets because the idea of such compression was taught by others as far back as Hoffman. (*See* Figure 3, Appendix B). However, claim 9 does differ from the prior art by stating the mathematical proposition that such compression may be attained around a set of conductors whose outside diameters vary between 100% (minus clearance) and 60% of the width of the sockets.

The Level of Ordinary Skill in the Pertinent Art

"35 U.S.C. §103 provides for a specialized reasonable man test for obviousness." *Preuss* v. *General Electric Co., supra,* 392 F.2d at 32. In this case the reasonable person is the person with ordinary skill in design, mechanical, and electrical engineering. *See id.*

I find that the level of ordinary skill in those arts is such that a reasonable engineer engaged in those arts would have at least a college education and would be thoroughly educated in mathematics, physics, and mechanics. *Cf. Lerner* v. *Child Guidance Products, Inc.,* 406 F.Supp. 560, 565 (S.D.N.Y. 1975) ("In determining the issue of obviousness we must assume that the patentee was aware of all of this prior art when he made the invention. [citation omitted]"), *aff'd,* 547 F.2d 29 (2d Cir. 1976) (*per curiam*).

Thus the question becomes, "what would have been obvious to a reasonable [engineer] who, among other things, had the [Graham, Hoffman, Toedtman, and lynch] patents in mind when he endeavored to solve the problem" of the Kearney Series 81 connectors? *Preuss* v. *General Electric Co., supra,* 392 F.2d at 32-33. This question is to be answered in light of the fac-

tual background that has been provided above pursuant to the guidelines of *Graham* v. *John Deere Co., supra,* 383 U.S. at 17.

Obviousness and Patent Validity

All of the physical elements of the connector covered by the Zemels patent were known in the prior art. Therefore, the question is "whether the combination of the old elements created a valid combination patent." *Anderson's-Black Rock* v. *Pavement Co.,* 396 U.S. 57, 59 (1969).

In answering this question, I heed the admonition that "'[c]ourts should scrutinize combination patent claims with a care proportional to the difficulty and improbability of finding invention in an assembly of old elements. ...' " *Sakraida* v. *Ag Pro Co.,* 425 U.S. 273, 281 (1976) (quoting *Great A & P Tea Co.* v. *Supermarket Corp.,* 340 U.S. 147, 152 (1950)). *See Julie Research Laboratories, Inc.* v. *Guidelines Institute, Inc.,* 501 F.2d 1131, 1136 (2d Cir. 1974) (a combination patent must be scrutinized with special care).

A useful test to be applied in cases involving the question of the obviousness of combination patents was stated by Mr. Justice Stevens while he was still a Circuit Judge. He stated that in such cases a court ought to ask:

> [F]irst, whether each element of the invention was obvious; second, if so, whether the combination is obvious, and third, if the combination seems obvious in itself, whether the rejection of the contrary teaching in the prior art requires a different conclusion [than that the combination is obvious].

E-T Industries, Inc. v. *Whittaker Corp.,* 523 F.2d 636, 641 (7th Cir. 1975), *cert. denied,* 429 U.S. 870 (1976). *Accord, Autex Corp.* v. *Shelley Radiant Ceiling Co.,* 536 F.2d 145, 150 (7th Cir. 1976). *See Julie Research Laboratories, Inc.* v. *Guideline Institute Inc.,* 501 F.2d 1131, 1134 (2d Cir. 1974).

Applying the *E-T Industries* test to the instant case, I find, first, that each element of the claimed invention was obvious. As stated above, the H-frame connector itself, the use of sockets of different sizes, the use of a body of ductile metal, the use of channels in the body, and the placement of the channels closer to the smaller socket than to the larger socket were all elements that had been developed in the prior art. They must be deemed to have been obvious to a reasonable engineer.

Second, I find that the combination of the elements in Zemels' invention was obvious. Zemels did combine the elements of the connector in new ways, at least in the sense that he described, in his claims 2, 3, 7-9, the relationships of the elements with greater mathematical specificity than had been done before. However, the fact that these combinations were new does not mean that they were not obvious. To the contrary, I find that a reasonable engineer, with the relevant prior art before him and with a thorough knowledge of mathematics, physics, and mechanics, would have found these new combinations obvious.[29]

Nor is this a case in which the combination must be found to be nonobvious because the combination produced a "synergistic" result. *See Sakraida* v. *Ag Pro Inc., supra,* 425 U.S. at 282. That is, the combination did not "result in an effect greater than the sum of the several effects [of the elements] taken separately." *Id.* (citing *Anderson's-Black Rock, supra,* 396 U.S. at 57). It may be granted that the combination resulted in significant improvements in H-frame connector technology, including the obtaining of a more desirable fit between the connector and the conductors by the exertion of less force than had been necessary in the past; the ability to effect such a fit on all models of conductors by means of a hand compressor (rather than a hydraulic compressor); and the reduction from 11 to seven in the number of models of connectors necessary to connect all the sizes of conductors then in use. However, these im-

provements are not sufficient to negate the finding of obviousness under Section 103:

> Rather, this patent simply arranges old elements with each performing the same function it had been known to perform, although perhaps producing a more striking result than in previous combinations. Such combinations are not patentable under standards appropriate for a combination patent. ... Exploitation of the principle[s] of [mathematics] adds nothing to the sum of useful knowledge where there is no change in the respective functions of the elements of the combination; this particular use of the assembly of old elements would be obvious to any person skilled in the art of mechanical application. See Dann v. Johnston, ante, [425 U.S.] at 229-230.
>
> Though doubtless a matter of great convenience, producing a desired result in a cheaper and faster way, and enjoying commercial success, [this connector] "did not produce a 'new or different function' ... within the test of validity of combination patents." Anderson's-Black Rock v. Pavement Co., supra, [396 U.S.] at 60. These desirable benefits "without invention will not make patentability." Great A. & P. Tea Co. v. Supermarket Corp., 340 U.S., at 153. See Dann v. Johnston, ante, at 230 n.4.

Sakraida, supra, 425 U.S. at 282-83.[30]

Further applying the test of *E-T Industries,* I find, third, that a conclusion different than that the combination was obvious is not required by "the rejection of the contrary teaching in the prior art. ..." *E-T Industries, Inc., supra,* 523 F.2d at 641. The question to be asked here is, is there "evidence that long accepted factors would deter any investigation into the combination used by [Zemels]"? *Id.* at 642. *See United States* v. *Adams,* 383 U.S. 39, 52 (1966) ("known disadvantages in old devices that would naturally discourage the search for new inventions may be taken into account in determining obviousness."). The

record here reveals no evidence of factors that would have deterred Zemels' investigation into the combination he finally used. To the contrary, the combination that he finally used was clearly foreshadowed by several developments in the prior art, and these developments occurred in a fairly regular and unimpeded manner beginning with the Graham patent in 1943. There were no deterrents to an investigation of the mathematics and mechanics involved in the use of the H-frame connector. In fact it is likely that many of Zemels' predecessors themselves investigated the relevant mathematics and mechanics and that the only difference between those predecessors and Zemels himself was that he chose to rely on mathematical formlae and specifications in his patent application claims.

I conclude, therefore, that the Zemels patent's "subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art. ..." 35 U.S.C. §103. Because this conclusion seems to me to be clear, I find it inappropriate to consider the "secondary considerations," *Graham, supra,* 383 U.S. at 17, that Kearney urges upon me. Kearney advances a sizeable number of such considerations, including acceptance of the invention by others, the commercial success of the patented conductor, and the copying of the invention by others, including Burndy. However, when the finding of obviousness is mandated by other factors, such secondary considerations do not change that finding. *Graham, supra,* 383 U.S. at 36 ("these [secondary] factors do not, in the circumstances of this case, tip the scales of patentability."). *Accord, Roanwell Corp.* v. *Plantronics, Inc.,* 429 U.S. 1004, 1009 (1976) (White, J., joined by Brennan, J., dissenting from denial of writ of certiorari); *Danns* v. *Johnston, supra,* 425 U.S. at 230 n.4; *Anderson's-Black Rock, supra,* 396 U.S. at 61; *Digitronics Corp.* v. *New York Racing Association, Inc.,* 553 F.2d 740, 748 (2d Cir.) ("Only in a close case, in which application of the subjective criterion of nonobviousness in 35 U.S.C. §103 does not produce a firm conclusion, can those ob-

jective or secondary considerations be used to 'tip the scales in favor of patentability' [citations omitted]. Because we hold that the claims here are clearly obvious, we need not examine secondary considerations. [citations omitted]", *cert. denied,* 434 U.S. 860 (1977).[31]

VI.

Attorneys' Fees

Burndy contends that it is entitled to attorneys' fees because Kearney's conduct in prosecuting the Zemels patent[32] makes this an "exceptional case" within the meaning of 35 U.S.C. §285.[33]

Burndy's claim for attorneys' fees must be analyzed in light of the general rule that each party is to bear its own attorneys' fees:

> In patent suits, no less than other types of suits in the federal courts, it is the general rule that awarding attorneys' fees to the prevailing party is not favored absent a specific statute providing therefor. Here we have such a statute, but the relief it provides is not usually granted. The patent suit involved must qualify as an "exceptional" case. It is obvious from the language of 35 U.S.C. §285 that Congress intended the trial court to exercise its sound discretion in deciding whether a case was sufficiently exceptional to vitiate the normal rule that each party bear his own attorneys' fees.

Kahn v. *Dynamics Corp. of America,* 508 F.2d 939, 945 (2d Cir.), *cert. denied,* 421 U.S. 930 (1975).

The recognized categories of exceptional cases under Section 285 include cases involving fraud on the patent office, *Digitronics, Inc.* v. *New York Racing Association, Inc., supra,* 553 F.2d at 749; gross negligence or bad faith in the prosecution of a patent, *Kahn* v. *Dynamics Corp. of America, supra,* 508

F.2d at 945; and unclean hands in the prosecution of a patent. *Timely Products Corp.* v. *Arron,* 523 F.2d 288, 305 (2d Cir. 1975), *cert. denied,* 429 U S. 870 (1976); *Trans-World Display World Corp.* v. *Mechtronics Corp.,* 437 F.Supp. 692, 703 (S.D.N.Y. 1977) (dictum). I find that Kearney's conduct does not fall into any of these categories.

The Zemels patent is based on a continuation in part application. The first application, filed in June, 1964, was abandoned after it had been rejected by the examiner. In the original application, Zemels stated that "[p]referably, but not necessarily" the distance from the channel to the bottom of the smaller socket is slightly less than the distance from the channel to the larger socket. This language suggested that the relative spacing of the channels to the sockets was not critical. Thus the original application would have permitted the channels, if placed on the outside of the connector body, to be spaced equidistant from the two sockets. The original application also stated that the channels could be located inside the sockets.

The examiner rejected all claims of the original application. He found that the Hoffman patent and the Toedtman '746 patent anticipated Zemels' claims.

Zemels then amended his claims by specifying that the channels be located on the outside of the connector body. The examiner, citing the Lynch patent, again rejected Zemels' claims.

Soon thereafter Zemels abandoned his original application, but, before doing so, he filed the continuation in part application, in which there appeared mathematical formulae expressing the spatial relations among various of the connector's elements. The examiner rejected the claims in the second application on the basis of, *inter alia,* the Lynch patent, and the examiner stated that he did not understand the mathematics formulae that appeared in the second application. Zemels and Kearney sought to explain the formulae and stated that the formulae yielded a "dividing line" between compression connectors that

could be expected to perform well in certain respects and connectors that could not so perform. Zemels' trial testimony on this matter was somewhat unclear and equivocal, but he appeared to admit that the formulae did not yield a dividing line of such a critical nature that it could never be crossed or altered, and that he himself sometimes purposely designed connectors that fell outside the claimed range in order to obtain certain improvements.

It may be that the claims asserting the formulae would never have been made if the examiner had not rejected Zemels' first application. It may be, too, that the examiner did not fully understand the mathematical formulae that appeared in Zemels' second application and that Zemels and the other Kearney agents were unsuccessful in explaining to the examiner the purpose of the formulae. However, the mere fact that Kearney undertook the usual jockeying that occurs in the prosecution of a patent and that Zemels and the other Kearney agents may have been less than successful in their efforts to instruct the examiner on the details of mathematics contained in the second application does not mean that Kearney has abused the patent office in such a way as to require that an award of attorneys' fees be made to Burndy.

On the basis of the testimony that I have heard and the papers before me, I cannot conclude that Kearney was guilty of fraud, bad faith, gross negligence, or unclean hands in its prosecution of the Zemels patent. Burndy's request for an award of attorneys' fees under 35 U.S.C. §285 is denied.

Settle Judgment on Notice.

/s/Vincent L. Broderick, U.S.D.J.

Dated: New York, New York
January 2, 1979

[1] Compression connectors will be discussed in detail *infra*.

[2] 35 U.S.C. §101 provides:

§101. Inventions patentable

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title. July 19, 1952, c. 950, §1, 66 Stat. 797.

35 U.S.C. §102 provides:

§102. Conditions for patentability; novelty and loss of right to patent

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for patent, or

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

(c) he has abandoned the invention, or

(d) the invention was first patented or caused to be patented, or was the subject of an inventor's certificate, by the applicant or his legal representatives or assigns in a foreign country prior to the date of the application for patent in this country on an application for patent or inventor's certificate filed more than twelve months before the filing of the application in the United States, or

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent, or

(f) he did not himself invent the subject matter sought to be patented, or

(g) before the applicant's invention thereof the invention was made in this country by another who had not abandoned, suppressed, or concealed it. In determining priority of invention there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other. July 19, 1952, c. 950, §1, 66 Stat. 797.

35 U.S.C. §103 provides:

§103. Conditions for patentability; non-obvious subject matter.

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made. July 19, 1952, c. 950, §1, 66 Stat. 798.

35 U.S.C. §112 provides:

§112 Specification

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the appellant regards as his invention.

A claim may be written in independent or, of the nature of the case admits, in dependent or multiple dependent form.

Subject to the following paragraph, a claim in dependent form shall contain a reference to a claim previously set forth and then specify a further limitation of the subject matter claimed. A

claim in dependent form shall be construed to incorporate by reference all the limitations of the claim to which it refers.

A claim in multiple dependent form shall contain a reference, in the alternative only, to more than one claim previously set forth and then specify a further limitation of the subject matter claimed. A multiple dependent claim shall not serve as a basis for any other multiple dependent claim. A multiple dependent claim shall be construed to incorporate by reference all the limitations of the particular claim in relation to which it is being considered.

An element in a claim for a combination may be expressed as a means or step for performing a specified function without the recital of structure, material, or acts in support thereof, and such claim shall be construed to cover the corresponding structure, material, or acts described in the specification and equivalents thereof.

As amended July 24, 1965, Pub.L. 89-83, §9, 79 Stat. 261; Nov. 14, 1975, Pub.L. 94-131, §7, 89 Stat. 691.

35 U.S.C. §285 provides:

§285. Attorney fees

The court in exceptional cases may award reasonable attorney fees to the prevailing party. July 19, 1952, c. 950, §1, 66 Stat. 813.

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[3] 35 U.S.C. §271(a) and (b) provide:

§271. Infringement of patent

(a) Except as otherwise provided in this title, whoever without authority makes, uses or sells any patented invention, within the United States during the term of the patent therefor, infringes the patent.

(b) Whoever actively induces infringement of a patent shall be liable as an infringer.

---

[4] Burndy concedes that its compression connectors infringe at least claim 1 of the Zemels patent. Trial Transcript ("Tr.") at 14. Therefore, if Burndy failed to establish that the Zemels patent is in-

valid under any of the statutory sections cited, *see supra* n.2, Burndy would be liable for infringement. Because of this fact, I find it unnecessary in this case to follow "the approved procedure of deciding the question of alleged infringement." *Ling-Temco-Voight, Inc.* v. *Kollsman Instrument Corp.*, 372 F.2d 263, 265 (2d Cir. 1967).

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[5] *See supra* n.2.

---

[6] The injunction to be issued herein will not restrain Kearney and its privies from seeking to enforce patents other than the Zemels patent against Burndy. The issue of the validity of such other patents is not before me, and in this action I decide nothing about their validity.

---

[7] Burndy has also argued that the Zemels patent is invalid for lack of utility, 35 U.S.C. §101; for anticipation, 35 U.S.C. §102; and for lack of specificity; 35 U.S.C. §112.

---

[8] U.S. Patent No. 3,322,888. The six drawings that Zemels submitted with his patent application are appended to this Opinion as Appendix A.

---

[9] The nine claims of the Zemels patent are as follows:

> 1. In a compression connector of the character described having oppositely disposed conductor-receiving sockets, one of said sockets being of larger cross-sectional dimension than the other, and a body of ductile metal extending crosswise of said connector between said sockets, the improvement which comprises said crosswise extending body of metal having a void therein for accommodating compression of said body to shorten the distance between said sockets, said void being located in spaced relation with both sockets and substantially closer to the smaller socket than to the larger socket.
>
> 2. The connector of claim 1 wherein the cross-sectional area of the void is between 0.034 and 0.046 of the cross-sectional area of the connector including the void but excluding the socket space.

3. The connector of claim 1 wherein the void delineates constrictions in said crosswise extending body, said constrictions extending from said void to each of said sockets, and the constrictions extending to the larger socket are of greater length than the constrictions extending to the smaller socket.

4. In a compression connector of the character described having oppositely disposed conductor receiving sockets, each of said sockets being proportioned to receive conductors whose outside diameters vary between a maximum and a minimum, and a body of ductile metal extending crosswise of said connector between said sockets, the improvement which comprises: said body having a void substantially spaced from said sockets and extending for the full length of said body, and said void having a cross-sectional area of between 0.034 and 0.046 times the cross-sectional area of the connector including the void but excluding the socket space.

5. The improvement of claim 4 wherein said void is open to the exterior of said connector.

6. The improvement of claim 4 wherein said void is delineated by channels on the exterior of said body at opposite sides of the connector.

7. The connector of claim 6 wherein the average dimension h of said channels in the direction parallel to a plane including the axes of both socket is

$$0.0200 \pm 15\% \text{ (C/B)}$$

and the average dimension b thereof in the direction perpendicular to said plane is

$$0.1500 \pm 15\% \text{ (W)}$$

where W is the dimension of the connector parallel to b and C is the cross-sectional area of the connector including the channels but excluding the socket space.

8. The connector of claim 7 wherein the shortest distance d between each channel and the smaller socket is related to the shortest distance d' between each channel and the larger socket according to the formula:

$$\frac{d'}{d} = \frac{D_L}{D_S} + \left(\frac{D_L - D_S}{t} \times \frac{KW'}{t}\right) - \left(\frac{D_L - D_S}{W - t} \times \frac{t}{KW'}\right)$$

where K is a coeffecient having a value of 0.33 ± 0.05, where t is the distance between the bottoms of opposite sockets, where D_L and D_S are the widths of the larger and smaller sockets respectively, and where the other values are as indicated in claim 7.

9. An H-frame compression connector having opposite sockets for the reception respectively of line conductors and tap conductors, said sockets having smooth concave bottom surfaces intervened by a crossbar of metal, said crossbar having indentations at the opposite sides of said crossbar, said indentations extending lengthwise of the connector and each having a cross-sectional area of between 4% and 12% of the sum of the cross-sectional areas of the sockets, whereby said connector is compressible to the same ultimate cross-section, in the same compression dies, about conductors whose outside diameters vary between 100% (minus clearance) and 60% of the width of said sockets.

U.S. Patent No. 3,322,888.

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[10] U.S. Patent No. 2,307,216. *See Scope and Content of the Prior Art, infra.*

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[11] U.S. Patent No. 2,707,775. *See Scope and Content of the Prior Art, Infra.*

---

[12] For the details of the prosecution of the Zemels patent, *see Attorneys' Fees, infra.*

---

[13] This finding does not entail that the scope of the prior art is restricted to design, mechanical, and electrical engineering as those arts pertain to the problems of electrical compression connectors. The scope also includes those arts as they pertain to other reasonably related problems. *See Danns* v. *Johnston, supra,* 425 U.S. at 228 (in determining obviousness issue in case involving data processing system used in banking industry, Court looked to, *inter alia,* data processing system used in a large business organization); *Graham* v. *John Deere Co., supra,* 383 U.S. at 35 ("[t]he problems confronting [the

patentee] . . . were not insecticide problems; they were mechanical closure problems. Closure devices in such a closely related art as pouring spouts for liquid containers are at the very least pertinent references."

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[14] The drawings that were filed with the application for this patent are found in Appendix B to this Opinion.

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[15] The drawings that were filed with the application for this patent are appended hereto in Appendix C.

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[16] U.S. Patent No. 2,938,069. The drawings that were filed with the application for this patent are appended hereto in Appendix D.

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[17] U.S. Patent Number 3,156,764. The drawings that accompanied the application for this patent are found in Appendix E.

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[18] U.S. Patent Number 3,183,025. The drawings that accompanied the application for this patent are found in Appendix F.

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[19] The Toedtman '069 patent does not expressly claim the use of a channel to accommodate the compression of the connector's body. However Figure 4 of the drawings that accompanied the application that led to Toedtman '069 discloses that the use of a channel produces this result. (*See* Appendix D). Thus, the claim of using the channel to accommodate the compression of the connector's body does not distinguish claim 1 of the Zemels patent from the prior art. *Graham* v. *John Deere Co., supra,* 383 U.S. at 31 n.17 ("While the sealing feature was not specifically claimed in the [prior art] patent, it was disclosed in the drawings and specifications. Under long-settled law the feature became public property. [citation ommitted]").

[20] The Toedtman '764 patent placed the channels inside of the sockets. (*See* Numbers 16 and 21 of Figure 2, Appendix E). The patent claimed one of the purposes of such channel to be to "caus[e] the arms to bend inwardly at the [socket] bottom and [to] preclud[e] bulging of said arms in this region." Thus, the idea of the Toedtman '764 channel is to attain the snuggest possible fit between the connector's socket and the conductor, and doing so would have entailed accommodating the compression of the body of the connector.

[21] Even if this claimed use of the channel did distinguish claim 1 from the prior art, that use of the channel would not render the Zemels patent valid. *See General Electric Co.* v. *Jewel Co.*, 326 U.S. 242, 247 (if A patents x without realizing virtues v of x, B cannot obtain a patent on x on the basis of B's being the first one to perceive virture v in x).

[22] *See supra* n.9.

[23] Whether or not this difference and the differences to be noted between claims 4 through 9 and the prior art render the Zemels patent's subject matter sufficiently different under Section 103 remains to be discussed. *See infra.*

[24] *See supra* n.9.

[25] *See supra* n.9.

[26] *See supra* n.9.

[27] *See supra* n.9.

[28] *See supra* n.9.

[29] Plaintiff has argued vigorously that the mathematical formulae and specifications in Zemels' claims are inaccurate, misleading, and useless. I need not consider plaintiff's argument at this point because I find that those formulae and specifications, even if they are correct and helpful, would have been obvious to a reasonable engineer who set out to solve the problem of improving the H-frame connector. *But see Attorneys' Fees, infra.*

[30] Kearney has argued that another significant effect of the combination in Zemels' invention is that connectors that comply with Zemels' invention are able to pass a particular heat cycle test, allegedly deemed of critical importance by the utility companies, while no connectors that do not comply with Zemels' invention can pass that test. There is record evidence to cast doubt on that claim; however, even if the claim were conceded, it would be of no help to Kearney. First, the fact that a Zemels conductor can pass such a test is not a "synergistic" result within the meaning of *Sakraida*. Second, the claim is not even available to Kearney at this point in the proceedings because it was not made in the specifications of the patent. *Lincoln Co.* v. *Stewart-Warner Corp.*, 303 U.S. 545, 550 ("No such function . . . is hinted at in the specifications of the patent. If this were so vital an element in the functioning of the apparatus it is strange that all mention of it was omitted.") (footnote omitted).

[31] The result reached here is not contrary to the doctrine, heavily relied on by Kearney, that a patent, once issued, is presumed to be valid. For "'the most that can be said of the presumption is that it requires that reasonable doubt on the question of validity be resolved in favor of the patent holder.'" *Lemelson* v. *Topper Corp.*, 450 F.2d 845, 849 (2d Cir. 1971) (quoting *Lorenz* v. *F. W. Woolworth Co.*, 305 F.2d 102, 105 (2d Cir. 1962)), *cert. denied*, 405 U.S. 989 (1972). *Accord, Ken Wire & Metal Products, Inc.* v. *Columbia Broadcasting System*, 338 F.Supp. 624, 629 (S.D.N.Y. 1971), *aff'd*, 464 F.2d 1393 (2d Cir. 1972) *(per curiam)*. There is no such reasonable doubt here.

Moreover, Kearney's heavy reliance on the district court opinion in *Plantronics, Inc.* v. *Roanwell Corp.*, 403 F.Supp. 138 (S.D.N.Y.

1975), *aff'd,* 535 F.2d 1397 (2d Cir.) *(per curiam), cert. denied,* 429 U.S. 1004 (1976) *rehearing denied,* 429 U.S. 1079 (1977), is misplaced. In their dissent from the denial of certiorari, Justices White and Brennan criticized the district court opinion for failing to follow the *Graham* guidelines and for relying instead on "secondary considerations" as to the issue of obviousness. 429 U.S. at 1009. More recently, the Second Circuit, in a case in which it found no need even to reach the secondary considerations, recognized the importance of the dissent from the denial of certiorari in *Plantronics* and stated that the Second Circuit rule is in accord with that dissent. *Digitronics, Inc., supra,* 553 F.2d at 748-49 n.5.

---

[32] The Zemels patent was granted to Carl G. Zemels, who assigned it to Kearney. The patent was prosecuted by Kearney's legal staff. Therefore, although the patent was granted to Zemels, Kearney is responsible for the conduct that occurred in the prosecution of the patent.

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[33] *See supra* n.2.

APPENDIX A

May 30, 1967 C. G. ZEMELS 3,322,888

COMPRESSION CONNECTOR

Filed May 12, 1966 2 Sheets-Sheet 1

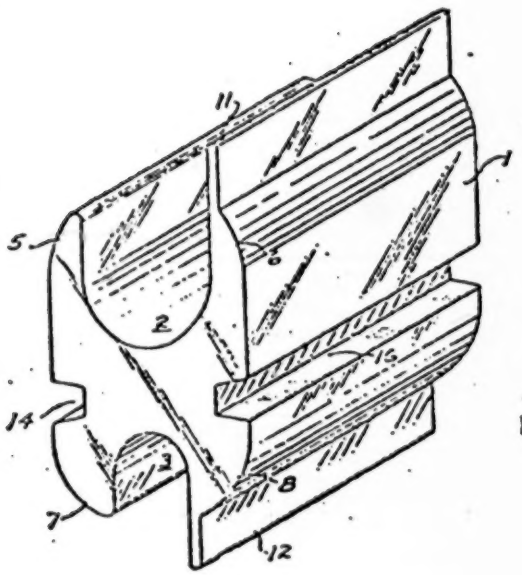


FIG. 1.

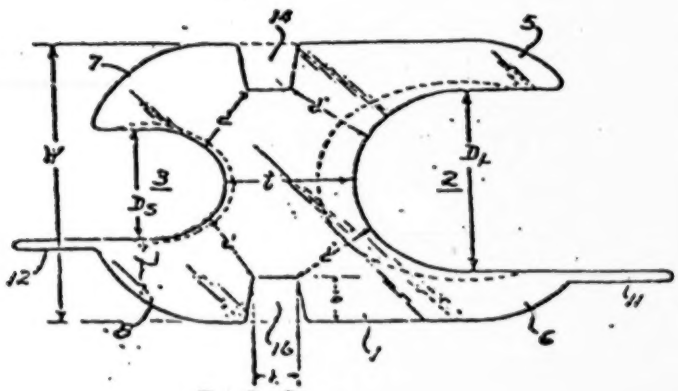


FIG. 2.

INVENTOR
CARL G. ZEMELS
BY
ATTORNEY

APPENDIX A

May 30, 1967 C. G. ZEMELS 3,322,888

COMPRESSION CONNECTOR

Filed May 12, 1966 2 Sheets-Sheet 2

FIG. 3.

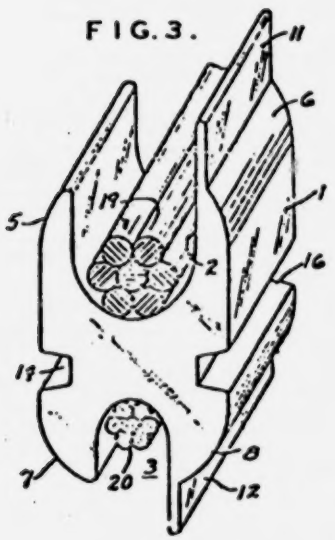
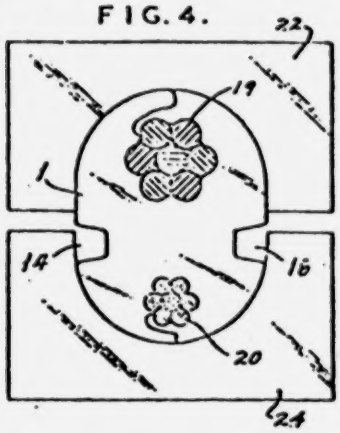


FIG. 4.



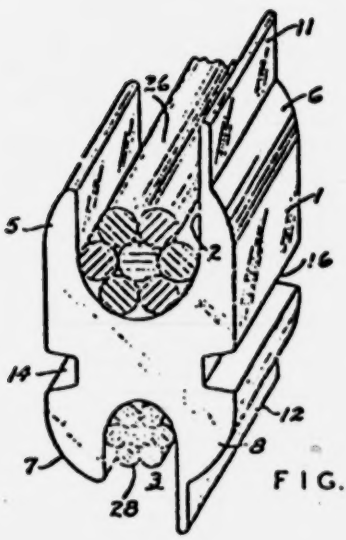


FIG. 5.

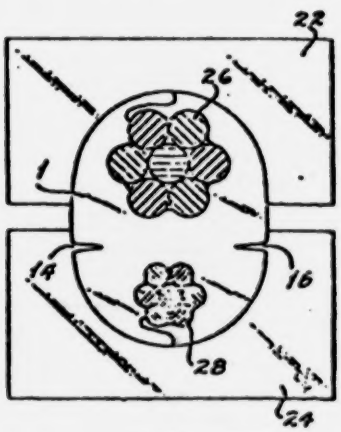


FIG. 6.

INVENTOR
CARL G. ZEMELS
BY
ATTORNEY

APPENDIX B

Jan. 5, 1943. R. GRAHAM 2,307,216

CONNECTOR

Filed April 21, 1941

Fig. 1

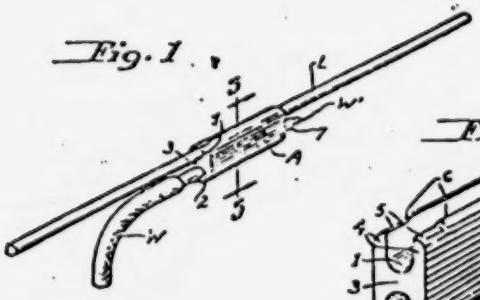


Fig. 2

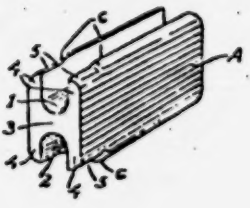


Fig. 3

Fig. 4

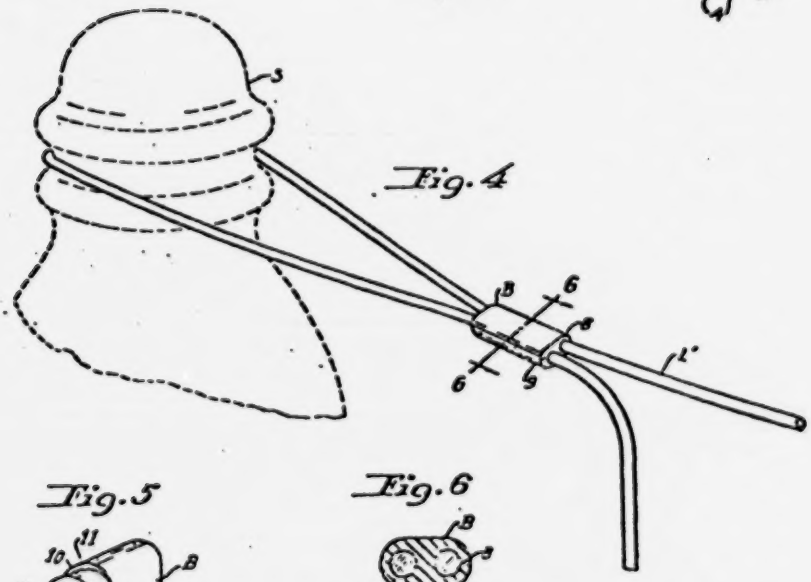


Fig. 5

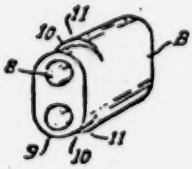


Fig. 6

INVENTOR
ROY G. GRAHAM
BY E. Harrington
ATTORNEY

APPENDIX C —

—

May 3, 1955 J. D. HOFFMAN ET AL 2,707,775

ELECTRICAL CONNECTORS

Filed Jan. 22, 1951

FIG. 1.

FIG. 2.

FIG. 3.

FIG. 4.

FIG. 5.

FIG. 6.

FIG. 7.

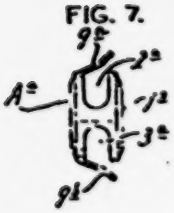


FIG. 8.

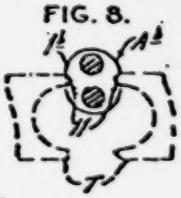
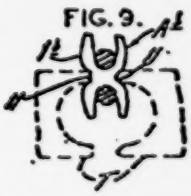


FIG. 9.



INVENTORS.
JOSEPH D. HOFFMAN
BY EUGENE E. HOLKE

ATTORNEY

APPENDIX D

PATENT DE
PLEASE RETU

May 24, 1960

J. A. TOEDTMAN

COMPRESSION TYPE ELECTRICAL CONNECTOR

Filed March 7, 1957

FIG. 1.

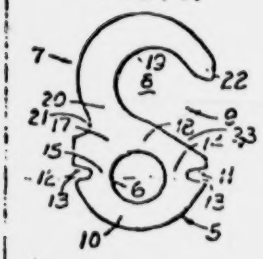


FIG. 2.

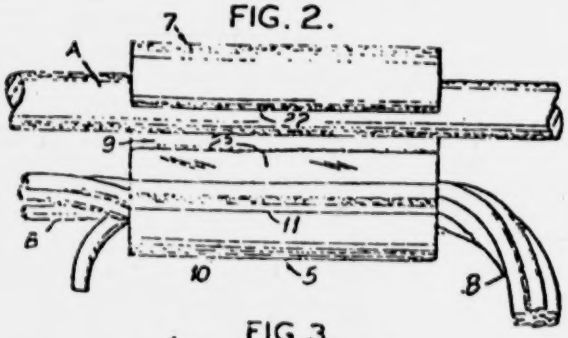


FIG. 4.

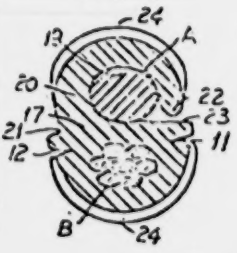


FIG. 3.

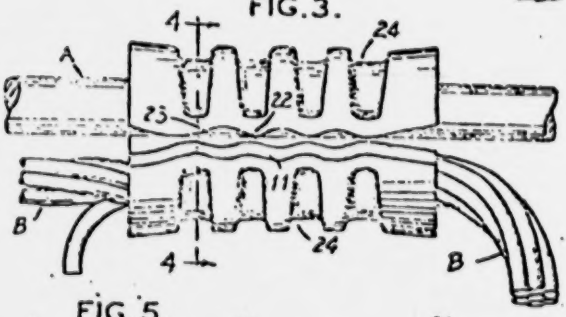


FIG. 5.

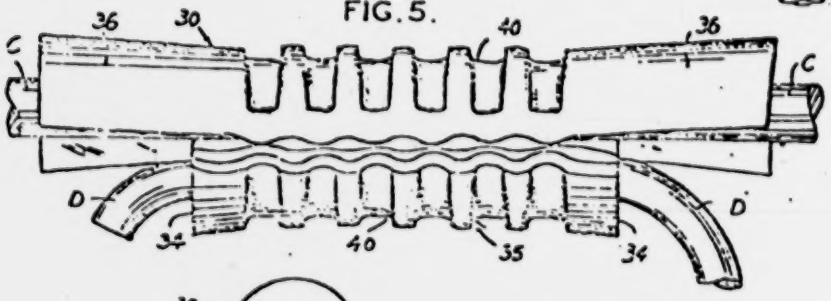


FIG. 6.

INVENTORS
JOHN A. TOEDTMAN,
BY WILLIAM E. WILTON
Terry and Ole
ATTORNEYS.

APPENDIX E

Nov. 10, 1964 J. A. TOEDTMAN 3,156,764

COMPRESSIBLE ELECTRICAL CONNECTOR WITH INTERNAL DEFORMABLE RIBS

Filed March 26, 1962

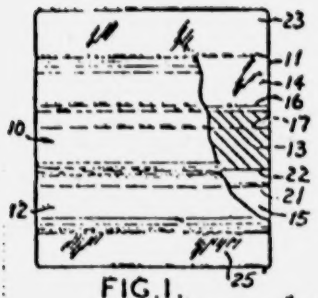


FIG. 1.

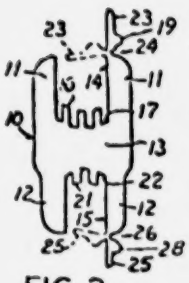


FIG. 2.

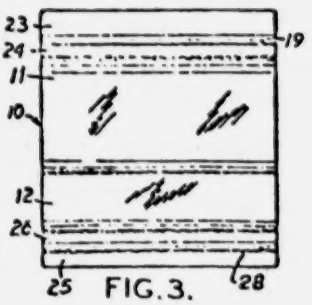


FIG. 3.

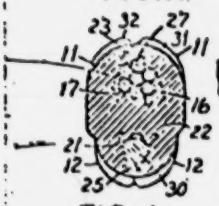


FIG. 4.

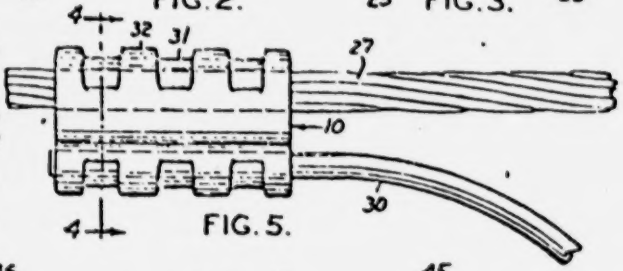


FIG. 5.

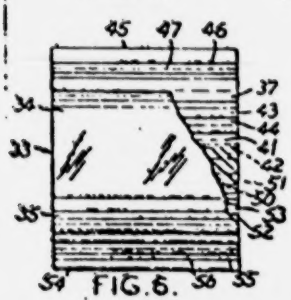


FIG. 6.

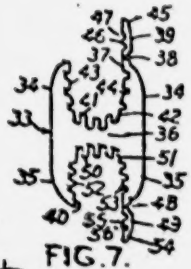


FIG. 7.

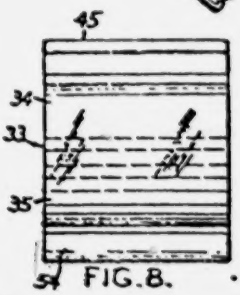


FIG. 8.

FIG. 9

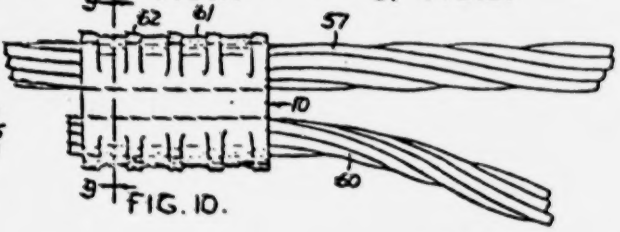


FIG. 10.

INVENTOR

JOHN A. TOEDTMAN

BY Cahill and Powell

ATTORNEYS

APPENDIX F

May 11, 1965 L. S. LYNCH, JR., ETAL 3,183,025

CONNECTOR WITH TEMPORARY CABLE HOLDING MEANS

Filed May 16, 1963

FIG. 1

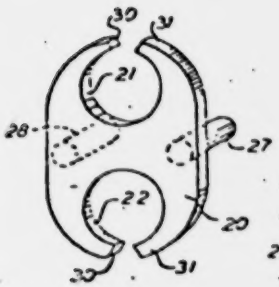
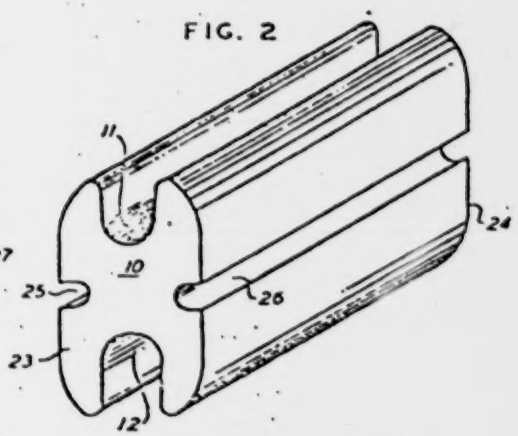


FIG. 2



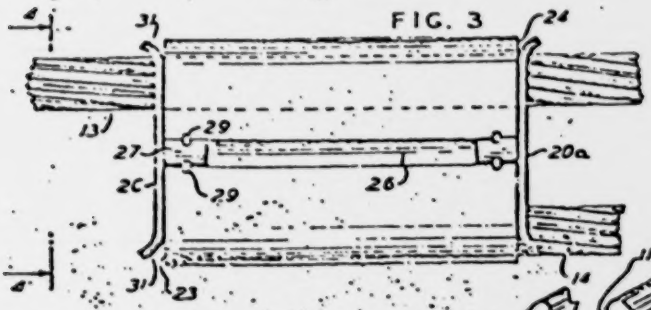


FIG. 3

FIG. 4

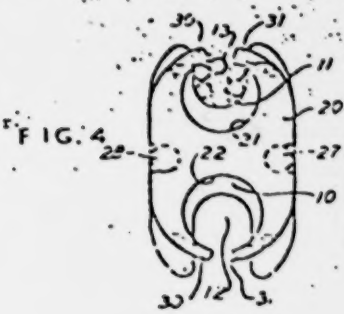
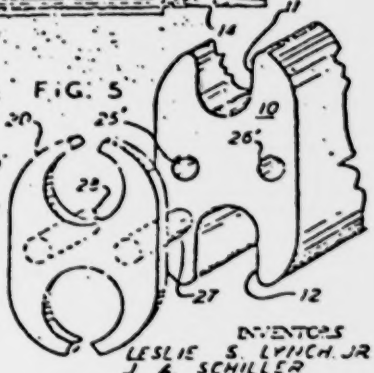


FIG. 5



INVENTORS
LESLIE S. LYNCH, JR.
J. A. SCHILLER
SYE L. ELDRIDGE

ATTORNEY

APPENDIX D

May 30, 1967 C. G. ZEMELS 3,322,888

COMPRESSION CONNECTOR

Filed May 12, 1966 2 Sheets-Sheet 1

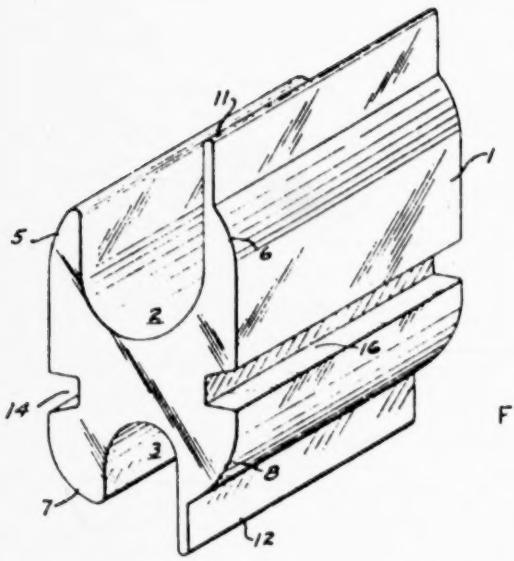


FIG. 1.

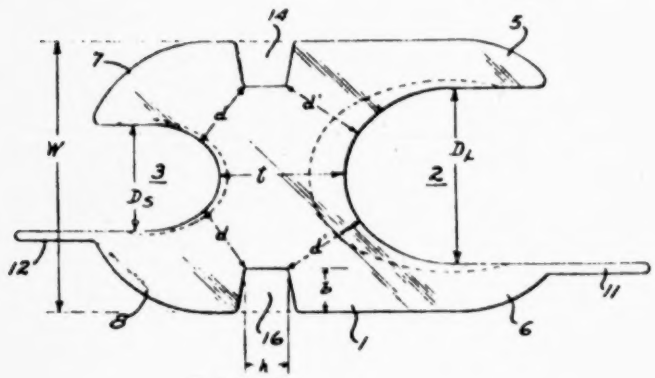


FIG. 2.

INVENTOR.
CARL G. ZEMELS
BY John H. Buchanan, Jr.

ATTORNEY

May 30, 1967 C. G. ZEMELS 3,322,888

COMPRESSION CONNECTOR

Filed May 12, 1966 2 Sheets-Sheet 2

FIG. 3.

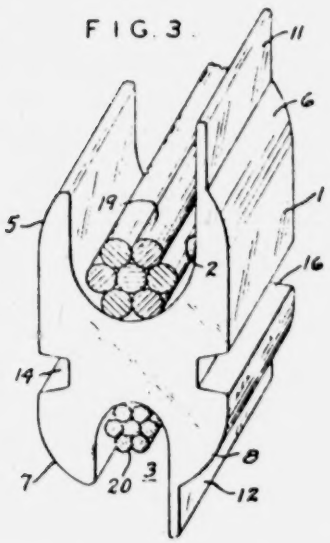
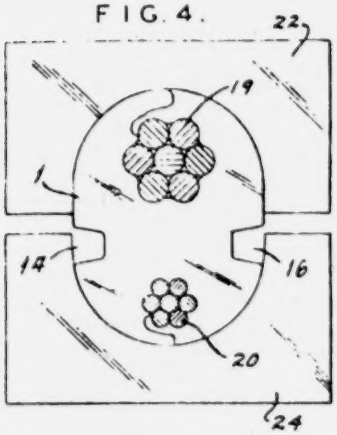


FIG. 4.



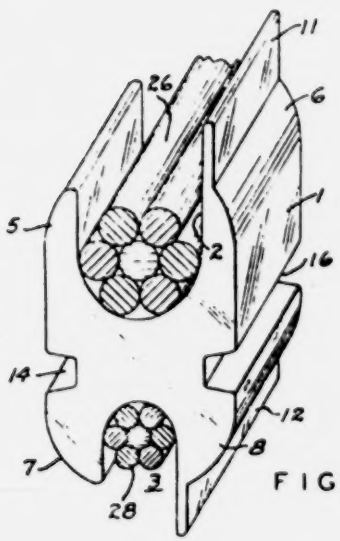


FIG. 5.

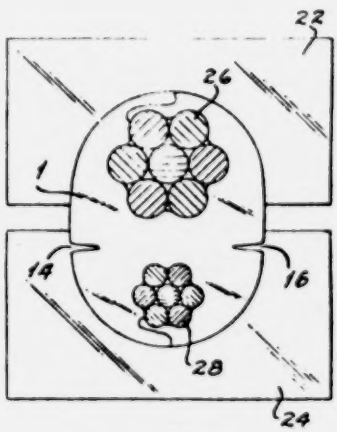


FIG. 6.

INVENTOR
CARL G. ZEMELS
BY John N. Dustin and J
ATTORNEY

UNITED STATES PATENT OFFICE

CERTIFICATE OF CORRECTION

Patent No. 3,322,888 May 30, 1967

Carl G. Zemels

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 4, line 5, for ".025 ± 15% C/b" read—.020 ± 15% (C/b)—; column 5, line 10, strike out "with the width of the dajacent socket. The lips 6 and 8" and insert instead—Socket 2 has lips 5 and 6. Socket 3 has lips 7 and 8.—; line 14, for "lines" read—lips—; column 6, line 4, for "requirements" read—requirements—.

Signed and sealed this 27th day of February 1968.

(SEAL)

Attest:

Edward M. Fletcher, Jr. EDWARD J. BRENNER

Attesting Officer Commissioner of Patents

UNITED STATES PATENT OFFICE

3,322,888

Patented May 30, 1967

3,322,888
Compression Connector

Carl G. Zemels, St. Louis, Mo., assignor to Kearney-National Inc., St. Louis, Mo., a corporation of Delaware

Filed May 12, 1966, Ser. No. 549,667

9 Claims. (Cl. 174—94)

This application is a continuation-in-part of my co-pending application Ser. No. 378,919, filed June 29, 1964, now abandoned.

This invention relates to compression fittings used on electric overhead conductors for making a connection between a line conductor and a tap, and particularly to such fittings which are adapted to accommodate a range of conductor sizes.

Compression type connector fittings of the general type referred to are disclosed in the patent to Hoffman et al., 2,707,775, and are commonly termed "H-frame" connectors, and are made of ductile metal such as "dead soft" aluminum (i.e., no harder than about Rockwell H 25) or Electrolytic "tough pitch" copper (99.9% pure) having a hardness no greater than about Rockwell F 45. Such fittings have a generally oval cross-sectional shape with two conductor receiving sockets located, respectively, at the opposite ends of the major axis of the oval. At least one, and usually both, of the sockets is U-shaped, and opens outwardly for ready reception of a conductor inserted radially. The U-shaped sockets have a curved bottom wall, and relatively parallel side walls spaced sufficiently to easily receive a conductor of the maximum diameter intended to be used in that particular socket. Usually, one of the sockets is larger than the other—the larger one for accommodation of the "line" conductor, and the smaller one for the tap conductor (which is seldom as large as the line conductor).

In practice, a connector is placed on a line conductor intermediate its length, with the larger socket astride the line conductor, and the smaller socket astride the tap conductor. The conductors are caged in the respective sockets by a suitable means, such as bendable members which may be bent over the open mouth of each socket. A compression tool with opposite relatively movable jaws is used to compress the metal of the fitting onto each conductor simultaneously. This tool is operated either manually or from a suitable power source, and carries a pair of reversely oriented, but usually identical, die pieces, one in each of a pair of movable jaws. In the common hydraulically powered tool, the respective die pieces are forced toward each other in parallel (and colliding) paths, while in the common manually powered tool, the die pieces are forced toward each other on arcuate (and colliding) paths which, during the compression stage, depart from parallel but slightly. The tool is placed on the fitting so that the respective die pieces embrace opposite sockets of the connector (and encaged conductors). The die pieces are then forcibly brought together to compress the fitting about the conductors, and into conformity with the composite internal contour of the die pieces when they have reached the limit of their movement toward each other. When the tool is manually operated, there is a practical limit to the force for operating the handles. It may take several separate applications of the manual tool at different positions along the fitting to complete the compression operation, but at each application, the increment of fitting embraced by the die pieces is conformed to an exterior profile corresponding with the composite internal contour of the die pieces when they have reached the limit of their movement.

The compression fitting is usually made of a ductile metal (aluminum or copper alloy), which metal will flow under the pressure developed between the die pieces so as to conform the sockets with the outside shape of the conductors in the sockets when the dies are fully closed, i.e., when nearly brought into

abutment with each other. The die compression changes the shape of the fitting, and during this change in shape, the metal, in excess of that necessary to fill the die cavity (at the limit of the compression stroke), flows into the sockets and elsewhere. Bearing in mind that, for practical purposes, each connector socket must be adapted to accommodate conductors whose outside diameters vary a few percent, it will be understood that the amount of socket lip metal which must be moved into a socket by the die compression depends upon the size of the conductor in that socket at the time of compression. With a given fitting, smaller conductors require the movement of more lip metal into the socket than do larger conductors, in order to obtain good mechanical and electric characteristics; and larger conductors require the movement of more metal than do smaller conductors, but the excess must go somewhere other than into the socket if, as is desirable, particularly with manually powered tools, the dies be closed to the limit of their movement, regardless whether the conductors in the sockets are at maximum or at minimum size. Otherwise, with a manually operated tool, there is no assurance that the requisite compression has been applied.

Now it can be readily appreciated that if the conductor is smaller in diameter than the socket is intended to accommodate, it is likely that such under-size conductor will not be gripped tightly when the fitting is compressed. With such an under-size conductor, in order to produce enough metal flow in the fitting to force the metal completely around the conductor, either the die cavities have to be smaller to produce a greater reduction and a greater metal flow, or the socket in the compression fitting has to be made smaller so that less metal is required to flow into surrounding relation with the conductor which requires that smaller die pieces be used. If the die is made smaller, then, of course, this die would be unsuitable for use on the fitting when a larger conductor is in the socket. On the other hand, it is impractical to require the use of more than one size die on a given size connector, and if the cavity in a given die is large

enough to close about its corresponding connector with the maximum intended size conductor in its socket, it may not move enough metal into the socket when occupied by the minimum intended size conductor. Thus, there has been a rather narrow limit to the range of conductor sizes which can be accommodated in a given H-frame connector or fitting without mutilating the socket interiors or breaking away surplus metal.

It is one of the objects of this invention to provide an H-frame compression type fitting for use in connecting conductors in electric line installations, which fitting may be compressed, without requiring unreasonable effort, to the final contour of the same die set about any of a relatively wide range of sizes of conductors.

In previous efforts to increase the conductor accommodation range of H-frame conductors, the "wrap-around" of the socket lips about the conductors in the sockets—particularly the smaller socket—has been erratic unless removable parts were resorted to. Hence, it is a further object of the invention to assure adequate wrap-around of both conductors during the stages of compression (at a given cross-section) prior to the movement (at that cross-section) of a substantial part of the connector metal elsewhere than into the sockets.

Generally stated, the invention achieves both of the aforesaid objectives by the provision of a void in the body of metal which intervenes opposite conductor receiving sockets; and regulating the location and magnitude of such void to control and accommodate the movement of connector metal sequentially during the compression operation, so that wrap-around of the conductors by the lips of both sockets is assured before cold-flow occurs, to any appreciable extent, between other increments of the connector cross-section under compression. The contemplated location of the void within said intervening body of metal is essentially such as to create a greater constriction in the connector metal at the root ends of their thicker socket lips than at the

root ends of their thinner socket lips—it being understood that to maintain uniformity of profile about the socket lips, the larger socket customarily has thicker lips than does the smaller socket. For connector fittings of conventional design, the location of the void, in accordance with the present invention, may be more simple expressed as: d is less than d', where d is the shortest distance between the void and the smooth interior wall of the smaller socket; and d' is the shortest distance between the void and the smooth interior wall of the larger socket.

The void contemplated by the present invention may be either on the inside or the outside of the body of metal which intervenes the opposite conductor receiving sockets, and can be formed during the process of extruding the stock from which the individual fittings are subsequently to be cut. Whether the void is in the form of opposite external indentations or in the form of one or more internal holes, it preferably extends from end to end of the fitting substantially parallel to the axes of the respective conductor receiving sockets, but substantially spaced from the concave surfaces of the sockets which are ultimately to be continguous with conductors. Such voids provide a major constriction in the body of metal which intervenes the sockets, and such major constriction delineates two pairs of minor constrictions located, respectively, between the body of the metal which intervenes the sockets and the several bodies of metal which constitute socket lips.

The magnitude of the void, or voids, which produce the aforesaid major constriction does not affect the function or operation of the constrictions, save to the extent that finite dimensions of the void determine the terminl (at one end) of the constrictions, but the magnitude of the voids must be maintained sufficiently low that a void does not defeat the purpose of adjacent minor constrictions by permitting cold-flow of metal from socket lips before metal from the same socket lips has wrapped around the conductors in the sockets. On the other hand, it will be understood that when each conductor receiving

socket of a given connector is being occupied by conductors of the maximum size which they will accommodate respectively, the maximum amount of metal is required to be moved by cold-flow from the socket lips to other portions of the connector. A substantial amount of this cold-flow will take place endwise of the connector, but the balance of it must be accommodated by the aforementioned voids if, as is desired, the ultimate profile to which a connector is compressed is the same when occupied by conductors at either end of its size range of accommodation. For example, the cross-sectional area of the void (e.g., the sum of the cross-sectional area of two exterior indentations) is preferably between 15 and 35% of (A-A′ + B-B′), where A and A′ are, respectively, the cross-sectional areas of the maximum and minimum size conductors usable in one socket, and B and B′ are, respectively, the cross-sectional areas of the maximum and minimum size conductors usable in the other socket. Substantially the same finite cross-sectional area of the void can be arrived at, without specifically involving conductor size range, if it be assumed that the connector is designed to accommodate, in each socket, conductors whose diameter is as small as about 60% of the socket diameter. Given that assumption, and the additional assumption that the interior surface of neither socket is undulated, the preferred cross-sectional magnitude of the void is the sum of the cross-sectional areas of two exterior indentations or side channels, and may be arrived at by using the following equations for calculating the cross-sectional area ($b \times h$) *of* each side channel:

$$h = .020 \pm 15\% \text{ (C/B)}$$

$$b = .150 \pm 15\% \text{ (W)}$$

where C is the cross-sectional area of the connector including the side channel areas (but not including the socket areas), said cross-section being normal to the axes of the sockets;

where W is the width (i.e., the dimension perpendicular to a plane including the axes of both sockets);

where b is the average depth (i.e., in the dimension parallel to W) of a side channel;

and where h is the average height (i.e., in the dimension perpendicular to b in the plane of the cross-section) of a side channel.

More empirically, when the conductor is of the general design shown in the accompanying drawing, and it is desired to accommodate conductors which vary in outside diameter from 100% (minus clearance) of the socket width to about 60% thereof, the cross-sectional area of the void can be determined, for practical purposes, as between about 4% and about 12% of the sum of socket areas, the percentage being toward the upper limit as the difference between the respective socket areas becomes greater, and as the difference between the maximum and minimum size conductors to be accommodated in a socket becomes greater.

The embodiment of the invention hereinafter described has the usual H-frame construction with conductor receiving sockets at opposite ends of the major diameter, and is provided, at the crossbar area, with voids in the form of exterior channels whose combined cross-section approximates twice the product of b times h aforesaid. These channels are preferably so designed and located in the body of the fitting as to resist compression by the dies until after the conductor receiving sockets have completely closed about the respective conductors. Any subsequent further movement of the dies to completely close, then closes the side channels to the degree necessary to compensate for size (above minimum) of the conductors in the respective sockets. When the channels, or other form of void, are located in the crossbar zone between the bottoms of the sockets, then the spacing of the conductor receiving sockets will be decreased, during compression of the channels, in a degree determined by the size of the conductors above minimum within the range for which the connector is intended.

Other objects and advantages of this invention will appear from the following detailed description which is in such full, clear and concise terms as to enable any person skilled in the art to make and use the same when taken in conjunction with the accompanying drawings, forming a part thereof, and in which:

FIGURE 1 is a view in perspective showing one end and one side of a compression type electric fitting constructed in accordance with this invention;

FIGURE 2 is an end view in full lines of the fitting shown in FIGURE 1, with broken lines indicating a fitting of the same size which is of standard configuration for comparison purposes;

FIGURE 3 is a view similar to FIGURE 1 illustrating the relative position of the parts of the fitting when applied to conductors of minimum size in the range of diameters to which the fitting is applicable;

FIGURE 4 is a view of the fitting shown in FIGURE 3 after being compressed by full closing of the dies;

FIGURE 5 is a view similar to FIGURE 1 illustrating the relative position of the parts when the fitting is applied to conductors of larger size in the range of diameters to which the fitting is applicable; and

FIGURE 6 is an end view of the fitting shown in FIGURE 5 after being compressed by closing the dies of the same size as shown in FIGURE 4.

One embodiment of this invention and how it operates is schematically illustrated in the accompanying drawings. With reference to FIGURE 1, the H-frame type compression type electric fitting therein shown has a body **1** of ductile metal, such as aluminum or copper. Preferably, the body is part of an extrusion of indefinite length cut at spaced intervals into fittings of suitable length. The body **1** is extruded with oppositely opening

conductor receiving sockets **2** and **3** formed between opposed lips, with the width of the dajacent socket. The lips **6** and **8** These sockets are usually of different width and depth to accommodate a different size range of conductor diameters, and the thickness of the lips varies inversely with the width of the adjacent socket. The lines **6** and **8** carry bendable tabs **11** and **12**, respectively. The fitting is constructed externally so as to be generally rounded, but preferably not of exactly the same contour as the dies with which it is to used, on the lips **5** and **6**, as well as **7** and **8**. Between the lips **5** and **7**, and **6** and **8**, the external sides of the body **1** are generally flat and have the channels **14** and **16** formed therein. Only one pair of channels is shown, but it should be understood that several narrow channels are regarded as the equivalent of one wide channel.

FIGURE 2 shows, in full lines, the outline of a fitting, such as that in FIGURE 1, and, in dotted lines, a standard fitting of comparable size. The difference intended to be emphasized here is not only the presence of outside channels **14** and **16**, but also the difference in depth of the sockets **2** and **3** as compared with those of a standard fitting of the same size. It will be readily apparent that, absent the channels **14** and **16**, there is more metal in the body **1** shown in full lines than in the body outlined by broken lines. Comparison also will reveal that the open channels **14** and **16** reduce the amount of metal in the body **1** so that it is roughly comparable to the amount of metal in a standard fitting of the same size.

The "socket area" herein referred to is the C-shaped space embraced by the lips **5** and **6** for socket **2**, and embraced by lips **7** and **8** for socket **3**. The outward extremity of each "socket area" is a straight line tangent with the tip of lip **5** or **7** and parallel with dimension W.

FIGURE 2 also shows the location of dimensions hereinbefore designated *b*, *h* and W, as well as indicating that the shortest distance *d'* from a channel **14** or **16**, to the bottom of a

socket **2** is greater than the shortest distances *d* from either channel to the smaller socket **3.** FIGURE 2 also identifies the dimensions D_L, D_S and *t*, which are involved in arriving at the optimum finite ratios of d'/d according to the equation:

$$\frac{d'}{d} = \frac{D_L}{D_S} + \left(\frac{D_L - D_S}{t} \times \frac{KW}{t}\right) - \left(\frac{D_L - D_S}{W - t} \times \frac{t}{KW}\right)$$

where K is a coeffecient having a value of 0.33 (± 0.05).

It should be understood that the usual compression dies used on fittings of this type have part cylindrical cavities of constant radius. These dies are usually used in the jaws of a hand operated tool which is constructed with stops to limit closing so that the dies do not come into contact with each other at fully closed position.

Since a fitting of standard size has a certain amount of metal, it will be obvious that to fully close the dies on fittings by a manual operated tool using the same size dies will require more effort as the size of the conductors in the sockets is increased. Conversely, full closing of the dies will produce less total flow in the metal of the fitting as the size of the conductors in the sockets is decreased, because more of the socket lip metal comes to rest as "wrap-around" of the conductor in the socket than the same socket can accommodate when it is occupied by a substantially larger conductor.

Smaller conductors require the movement of more metal into the socket than do larger conductors, in order to obtain good mechanical and and electric characteristics. These conflicting requirements have effectively blocked full realization of versatility in the respects mentioned. As illustrated in the succeeding views of the drawings, however, a fitting based upon the concept here disclosed meets all of the requirements, and, at the same time, extends the size range of conductor diameters accommodated by the fitting without using a variety of different sized dies.

In FIGURE 3, a fitting is shown applied to conductors of the minimum intended diameter. The diameters of the conductors **19** and **20** are much smaller than the width of the sockets **2** and **3**, respectively. Tabs **11** and **12** are next bent over by finger pressure to hold the conductors **19** and **20** in place. Thereafter, the fitting **1** is compressed in a pair of dies **22** and **24** with cavities of constant radius, as above described. During the compression, lips **5** and **6**, **7** and **8**, fold inwardly, and there is a flow of metal due to the fact that the dies fill during closing. This flow of metal causes the metal of the fitting to enter between wires of the conductors **19** and **20** to form the desired joint or connection between conductors. It will be observed that there is sufficient metal to fill the dies **22** and **24**, and that no appreciable contraction of channels **14** and **16** has taken place.

In FIGURE 5, the same size fitting as in FIGURE 3 is shown applied to conductors in the maximum intended diameter. In other words, conductors **26** and **28** have a diameter corresponding to socket width, and, of course, conductors **26** and **28**, because of their larger diameter, have much more metal than conductors **19** and **20**. After tabs **11** and **12** are pushed in by finger pressure to hold the conductors **26** and **28**, then the compression tool is applied, and the fitting **1** compressed by fully closing the same dies **22** and **24**. During this operation, lips **5**, **6**, **7** and **8** are wrapped around the conductors—the wrap-around of lips **5** and **6** proceeding faster than the wrap-around of lips **7** and **8**. After the wrap-around phase of the operation is completed, or substantially so, further die pressure causes the metal of the fitting to flow into and between the exterior strands of conductors **26** and **28**, and also—because conductors **26** and **28** are at or near the maximum within the size range accommodatable by the connector—causes flow from the lips into the strut-like crossbar of body **1** between channels **14** and **16**, and when the dies are fully closed, channels **14** and **16** have closed almost fully as shown in FIGURE 6. This decreases the spacing between conductors **26** and **28**. Thus, as the size of the conduc-

tors increases from the minimum toward the maximum within the accommodatable size range, channels **14** and **16** are closed increasing amounts, but, at each cross-section under compression, the flow of metal is sequential first to wrap the lips around the conductors, and then otherwise, e.g., from the lips toward the socket intervening crossbar, from the latter into the side channels, and endwise out of the increments undergoing compression.

The relationship of $d' \blacktriangleright d$ tends to restrain the flow of metal from the lips into the socket intervening crossbar until after the lips of both sockets have wrapped around their respective conductors. Otherwise, once the thin lips (about the larger socket) have wrapped about their conductor, the void (formed, for example, by the side channels) is likely to collapse before the thick lips (about the smaller socket) have sufficiently wrapped around their conductor to assure an efficient connection. It is the location rather than the finite magnitude of the void which so controls the sequence of metal flow.

On the other hand, the finite magnitude of the void controls the facility with which the connectors can be compressed to the limit of their appropriate die set without regard to whether the encaged conductors are at one extreme or the other of the range of sizes accommodatable by the connector.

An illustrative example of the finite dimensions of the various parts of a typical connector made in accordance with the present invention is as follows:

D_L	inches	0.58
D_S	do	0.39
t	do	0.40
W	do	0.885
d	do	0.255
d'	do	0.35
b	do	0.14
h	do	0.11
C	square inches	0.705

Such a connector is efficiently usable with line conductor in socket **2** varying from an outside diameter of 0.461 inch up to within a few thousandths (clearance) of 0.58 inch; and with tap conductor in socket **3** varying from an outside diameter of 0.25 inch up to within a few thousandths (clearance) of 0.39 inch.

The improvement in size versatility or range of conductor sizes obtained by redistribution of metal in a fitting as above described is not the only advantage of this invention. For instance, the fitting would have little sales appeal or utility if the die pressure needed exceeded the strength of the lineman operating the manual tool. In this respect, this invention also exceeds expectations because comparative tests have shown that a standard H-frame connector (Kearney 348-81) requires over eighty pounds of manual force on the tool handles in order to fully close the dies during each tool application to the fitting with a 4/0 ACSR conductor in one socket, and 1/0 str. compressed conductor in the other. These are the largest conductor sizes for the fitting which is shown outlined in broken lines in FIGURE 2. Tests of the fitting shown in full lines have shown that during each tool application to the fitting with the same size conductors, the manual force on the tool handles required never exceeded seventy pounds. In fact, the force required for the first stroke of the tool was about sixty-eight pounds, and thereafter it decreased for subsequent strokes to about fifty-one pounds.

Changes in and modifications of the constructions described may be made without departing from the spirit of my invention, or sacrificing its advantages.

Having thus described the invention, what is claimed and desired to be secured by Letter Patent is:

1. In a compression connector of the character described having oppositely disposed conductor-receiving sockets, one of said sockets being of larger cross-sectional dimension than the other, and a body of ductile metal extending crosswise of said connector between said sockets, the improvement which comprises, said crosswise extending body of metal having a void therein for accommodating compression of said body to shorten the distance between said sockets, said void being located in spaced relation with both sockets and substantially closer to the smaller socket than to the larger socket.

2. The connector of claim **1** wherein the cross-sectional area of the void is between 0.034 and 0.046 of the cross-sectional area of the connector including the void but excluding the socket space.

3. The connector of claim **1** wherein the void delineates constrictions in said crosswise extending body, said constrictions extending from said void to each of said sockets, and the constrictions extending to the larger socket are of greater length than the constrictions extending to the smaller socket.

4. In a compression connector of the character described having oppositely disposed conductor receiving sockets, each of said sockets being proportioned to receive conductors whose outside diameters vary between a maximum and a minimum, and a body of ductile metal extending crosswise of said connector between said sockets, the improvement which comprises: said body having a void substantially spaced from said sockets and extending for the full length of said body, and said void having a cross-sectional area of between 0.034 and 0.046 times

the cross-sectional area of the connector including the void but excluding the socket space.

5. The improvement of claim **4** wherein said void is open to the exterior of said connector.

6. The improvement of claim **4** wherein said void is delineated by channels on the exterior of said body at opposite sides of the connector.

7. The connector of claim **6** wherein the average dimension *h* of said channels in the direction parallel to a plane including the axes of both sockets is

$$0.0200 \pm 15\% \ (C/B)$$

and the average dimension *b* thereof in the direction perpendicular to said plane is

$$0.1500 \pm 15\% \ (W)$$

where W is the dimension of the connector parallel to *b* and C is the cross-sectional area of the connector including the channels but excluding the socket space.

8. The connector of claim **7** wherein the shortest distance *d* between each channel and the smaller socket is related to the shortest distance *d'* between each channel and the larger socket according to the formula:

$$\frac{d'}{d} = \frac{D_L}{D_S} + \left(\frac{D_L - D_S}{t} \times \frac{KW}{t}\right) - \left(\frac{D_L - D_S}{W - t} \times \frac{t}{KW}\right)$$

where K is a coefficient having a value of 0.33 ± 0.05, where *t* is the distance between the bottoms of opposite sockets, where D_L and D_S are the widths of the larger and smaller sockets respectively, and where the other values are as indicated in claim **7**.

9. An H-frame compression connector having opposite sockets for the reception respectively of line conductors and tap conductors, said sockets having smooth concave bottom surfaces intervened by a crossbar of metal, said crossbar having indentations at the opposite sides of said crossbar, said indentations extending lengthwise of the connector and each having a cross-sectional area of between 4% and 12% of the sum of the cross-sectional areas of the sockets, whereby said connector is compressible to the same ultimate cross-section, in the same compression dies, about conductors whose outside diameters vary between 100% (minus clearance) and 60% of the width of said sockets.

References Cited

UNITED STATES PATENTS

3,156,764	11/1964	Toedtman	174—94
3,183,025	5/1965	Lynch et al.	174—94 X

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